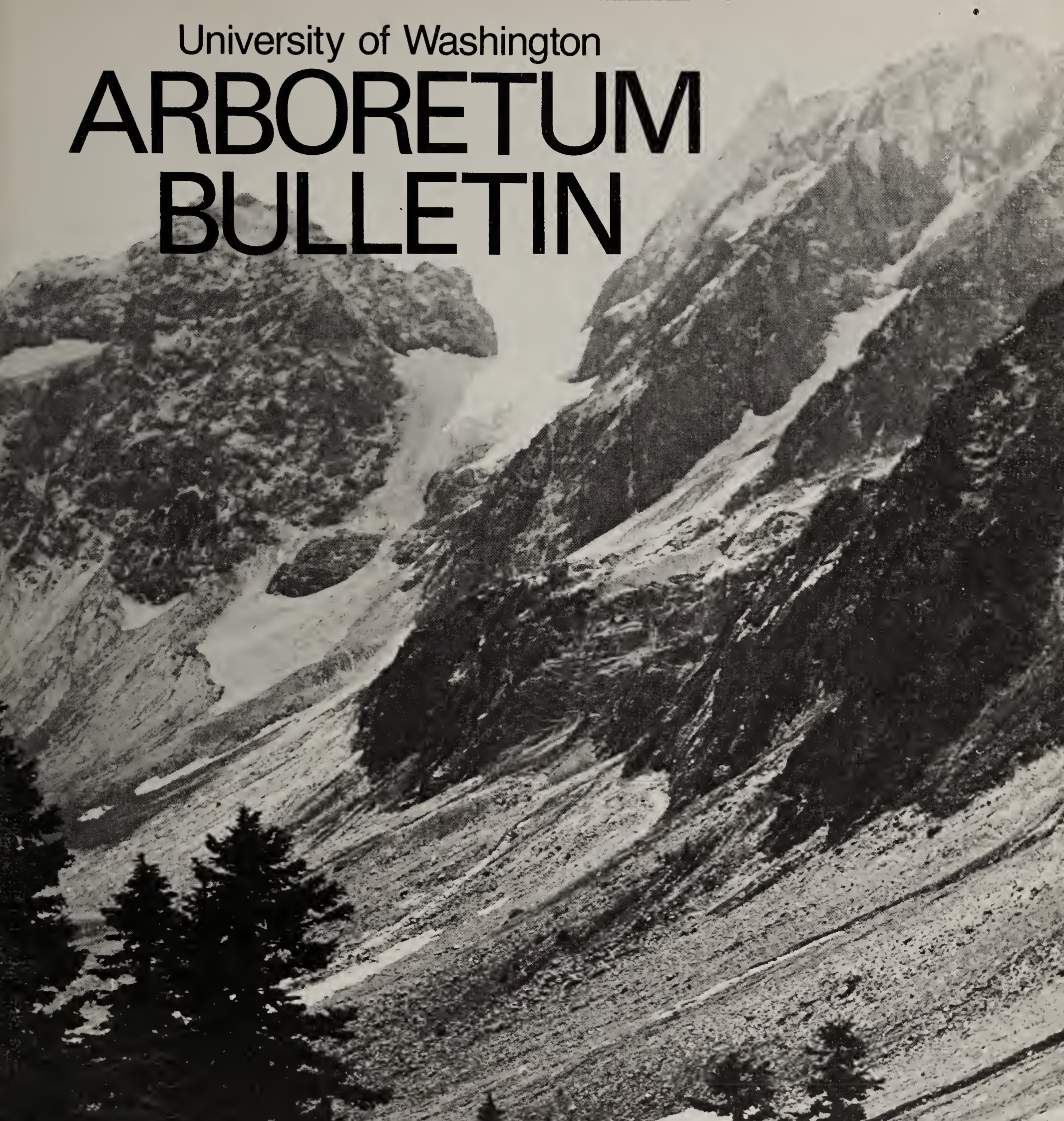
University of Washington

ARBORETUM BULLETIN



Vol. 39
No. 4
1976

PRESIDENT'S MESSAGE

Earlier today, I visited the Arboretum and was extremely pleased to see a University of Washington construction crew installing the Memorial Gates contributed by the Foundation.

These gates, which the Foundation commissioned Professor George Tsutakawa to create several years ago, are intended as a tribute to the citizens of Seattle who supplied the early leadership and effort which led to the establishment of the present Arboretum. Completion of the gates has been delayed for several years because of the lack of an overall policy direction for the Arboretum, including questions of public access, ownership and ultimate development objective.

While the installation of these gates is not a major capital improvement in itself, it may well mark a turning point in the development of the Arboretum in Washington Park.

I say this because the completion of the gates, after such long delay, is fresh evidence of the developing cooperation at the Arboretum between the City of Seattle and the University.

Simultaneously, the Arboretum Steering Committee, which represents both the City and the University, is preparing to call for bids on a consulting contract which should provide and define specific projects and objectives relative to the future development of Washington Park.

The membership of the Arboretum Foundation is dedicated to the development of a first-rate Arboretum in Washington Park which provides the maximum potential for public use, enjoyment and involvement.

It seems that the recent events are demonstrative of the fact that the pace of progress toward that objective is accelerating.

We congratulate both the City and the University on their recent accomplishments and on the constructive direction in which they are presently moving.

Sincerely,

THE ARBORETUM BULLETIN

Vol. XXXIX, No. 4
Seattle, Wa. 1976

OFFICERS

N. Stewart Rogers
President
Robert J. Behnke
1st Vice President
Mrs. Fred G. Clarke, Jr.
2nd Vice President
Mrs. John S. Robinson
3rd Vice President
Maj. Joseph W. Marshall
4th Vice President
Mrs. John A. Ogle
Secretary
Capt. Arthur P. Gardiner
Treasurer
John A. Putnam
Past President
Mrs. Marilynn R. Holm
Executive Secretary

BULLETIN EDITORIAL BOARD

Gordon D. Marckworth
Editor Emeritus

Jan Pirzio-Biroli
Editor
Linda B. Brubaker
Mrs. Donald W. Close
Mrs. Allen B. Engle
Mrs. Percy Guy
B.J.D. Meeuse
Brian O. Mulligan
John A. Putnam
R.F. Stettler
Mrs. Casimer Vorobik
Joseph A. Witt

Nancy Walz
Editorial Assistant

The ARBORETUM BULLETIN is a journal of general horticultural information published quarterly, as a bonus of membership, by the University of Washington ARBORETUM FOUNDATION, a non-profit organization to further the development of the University of Washington Arboretum. Information regarding membership in the Foundation may be obtained by writing to the ARBORETUM FOUNDATION, University of Washington, 98195 or by calling 325-4510. Articles on botany and horticulturally related subjects written by professional and amateur botanists, horticulturists, educators and gardeners are welcomed. No part of this BULLETIN may be reprinted without the authority of the ARBORETUM FOUNDATION. Lithography by Frayn Printing Company.

University of Washington

ARBORETUM BULLETIN

VOLUME 39, NUMBER 4, 1976

TABLE OF CONTENTS

President's Message ..... N. Stewart Rogers Inside Front Cover

The Memorial Gates:
A Symbol of Endurance ..... Rosamond P. Engle 2

Concerning this issue 3

Some relevant definitions 3

Endangered Species of the Americas:
Report on a Symposium at the
New York Botanical Garden ..... Joan Canfield 4

The Arboretum and Endangered
Plants ..... Joseph A. Witt 9

Revegetation in the Subalpine Zone .....
..... Joseph W. and Margaret M. Miller 12

What's Happening in the Pacific Northwest ..... Nancy Walz 17

The Washington Native Plant
Society ..... Arthur R. Kruckeberg 22

Collecting a Landscape ..... B. LeRoy Davidson 23

A Selection of Nurseries Offering Native Plants 25

A Seed Collector's Journey ..... Brian O. Mulligan 26

A Rare Plant Nursery:
How it Evolved ..... Mareen S. Kruckeberg 29

Notes and Comments 32

Announcements from the Unit Council ..... Ruth Mary Close 33

Classes 35

New Members 36

COVER
View from Cascade Pass
of Pelton Basin and Magic Mountain

Photo: Joseph W. Miller

The sculptor, George Tsutakawa Photo: Jean Henderson

The Memorial Gates

A Symbol of Endurance

ROSAMOND P. ENGLE

On the morning of November the second, 1976 Arboretum Drive East was closed to through traffic! What did this portend, we asked ourselves as we reached the sign, "Road Closed." Proceeding on foot until the lath houses appeared in view, we saw workmen engaged in some sort of engrossing activity. To the casual passerby this might have seemed of little significance but the sprightly figure of Professor George Tsutakawa provided our first clue. Was it possible that the long-awaited event was really here, that the impressive bronze gates were actually being installed? After reams of correspondence, innumerable meetings and delay upon delay, our MEMORIAL GATES were at last being erected. To those of us directly concerned with the project, this was indeed a momentous occasion.

For those who have not known the background of the gates, it might be appropriate to give a capsule history. In 1963 the idea of entrance gates to the Arboretum was conceived as a memorial to the late Emma Stimson, a widely respected civic leader. Preliminary plans were drawn by the late Harrison Overturf for their construction. The Arboretum Foundation approved his well-conceived plans and the project seemed to be off to a running start but the story had, in fact, just begun.

Following the death of Mr. Overturf the project entered another phase. In 1970 Professor Tsutakawa, noted sculptor, was selected to follow through with a design of his own creating. That year marked the 25th anniversary of the Arboretum which the Foundation hoped to commemorate with installation of gates at the south entrance to Arboretum Drive. Professor Tsutakawa submitted a beautiful model in bronze for our approval. Despite a further series of delays, an agreement was signed in 1971 by the University of Washington, the Arboretum Foundation and Professor Tsutakawa. By a consensus of opinion the project had assumed a larger significance and now became a general memorial to those who had cared about the Arboretum. It was again, we thought, just a matter of months until the project would be completed.

At this time, however, the University and the City of Seattle were attempting to work out plans for the joint operation of the Arboretum; lesser concerns were necessarily tabled, including consideration of the Memorial Gates. They might have been lost in oblivion at this point because of objections to their proposed locations by certain groups. If it had not been for the combined efforts of Arboretum enthusiasts, of those on the University Steering Committee and of City officials who saw the gates as symbolic of renewed civic interest and community concern for the Arboretum, it is probable that the gates would never have been installed.

When you visit the Arboretum, perhaps next spring when the cherry trees are in blossom across the road from the newly installed Memorial Gates, pause to consider their graceful lines, the product of one man's artistry. The antique-bronze gates, subdued in the reflected sunlight, are cunningly designed but so sturdily built as to resist time and its erosion. The poet Keats wrote, "A thing of beauty is a joy forever." This then is one story that has a happy ending.

Concerning this issue . . .

The *Arboretum Bulletin* usually covers a range of subjects suited to the varying interests of our readers. Occasionally, however, a single broad topic lends itself to treatment from several points of view. Such is the problem of rare and endangered plant species (and habitats). Widespread concern for these plants and their habitats has relatively recent origins. Ten years ago my neighbor was horrified to receive from her son and my daughter an enormous bouquet of trilliums gathered in another neighbor's ravine. Her awareness of the taboo against picking trillium was an expression of good conservation attitudes of that time. Today a much broader basis for conservation has been developed through the efforts of government agencies, scientists and concerned citizens.

We offer you a series of articles addressed to the subject, but not pretending to cover it in depth. We have not presented a completely consistent point of view, nor is it necessarily desirable to do so. There is a wide range of opinion among serious plantsmen regarding the best means of preserving rare plants and the ethics of collecting them.

In the latter respect, the Editorial Board and the administration of the Arboretum are united in recommending propagation by cuttings and seeds rather than by actual plant collecting.

In the future, related articles may appear that were either not ready for inclusion in this issue or that present material best treated as a sequel. We have been promised, for example, a description of bogs and bog ecology. These unique, rapidly disappearing habitats are a subject of fascination for some of our readers. We have native plant enthusiasts eager to learn successful methods of growing natives from seed; for them we shall seek out a propagator who can share his expertise.

The threat of extinction of the rare and beautiful things of our earth has hung over us for too long. We trust that you, our readers, will take hope in the positive progress and constructive attitudes that are presented in the following pages.

Some relevant definitions . . .

Extinct: those species of plants no longer known to exist after repeated search of the type localities and other known or likely places. Some species may be extinct in the wild but preserved by cultivation in gardens — such as the "Lost Franklinia" *(Franklinia alatamaha)* of southeastern United States.

Endangered: those species of plants in danger of extinction throughout all or a significant portion of their ranges. Existence may be endangered because of the destruction, drastic modification, or severe curtailment of habitat, or because of over-exploitation, disease, predation or even unknown reasons. Plant taxa from very limited areas, e.g., the type localities only, or from restricted, fragile habitats usually are considered endangered.

Threatened: those species of plants that are likely to become endangered within the foreseeable future through all or a significant portion of their ranges. This includes species categorized as rare, or depleted.

Quoted from: 1974 Report on Endangered and Threatened Plant Species of the United States. Smithsonian Institution, Washington, D.C.

Endangered Species of the Americas:

Report on a Symposium at the New York Botanical Garden

*JOAN CANFIELD**

Why be concerned about endangered plants? From a practical standpoint, human society has a vested interest in maintaining the plants from which it obtains food, shelter, medicine and other necessities. There are many historical cases of valuable plant compounds discovered in species thought to be useless. Plants now in danger of extinction may be valuable to future generations. If a hybrid agricultural crop falls prey to extensive disease or predation, we must return to its genetic precursors in order to revitalize the crop.

This argument for a "genetic seed bank" has other, less immediately practical implications as well. Botanical research, especially evolutionary studies, often depends on rare or endangered plants. A rare species provides a unique opportunity for studying the mechanisms of natural selection which lead to extinction or formation of new species. A more far-reaching concern for endangered species relates to the importance of maintaining a balanced ecosystem. If an uncommon plant species is eliminated, we can't predict the effects on other plants or animals.

The New York Botanical Garden held a symposium on threatened and endangered plant species in the Americas last May. Botanists representing 23 countries of the Western Hemisphere presented 40 talks, heard by nearly 200 participants at the symposium. Subjects included: the endangered species problem and the attitude of government, business, and native peoples toward it; plant families such as the orchids, which are particularly prone to human exploitation; and, finally, measures required to slow the extinction of plant species, including cooperative efforts on an international scale.

The New York Botanical Garden provided a fitting site for the symposium, with its history of extensive involvement in tropical botany. The Garden contains the largest botanical library in the country, and boasts a herbarium of four million specimens. Its 250 acres of native and exotic gardens in the Bronx made a beautiful setting for such a conference as well.

What is the extent of the endangered species problem? On a global scale, an estimated 20,000 out of the 300,000 plant species extant (one out of every 15) are endangered or threatened by extinction by the year 2000. In many areas of the world, especially the tropics, we have no knowledge of the number of plant species, and some are being wiped out right now. We have a better idea of the number of endangered plants in this country: over ten percent of our native species, subspecies and varieties are either extinct, endangered or threatened with extinction. The problem is surprisingly extensive.

The consequences of public concern with endangered plants are potentially far reaching. Land use could be affected enormously by government protection of rare species. Developers could be required to report the presence of threatened species before beginning construction activities. Setting aside tracts where such species grow would result in considerable preservation of natural areas.

In the United States, significant government involvement in the endangered species problem

---

*Joan Canfield is a graduate student in Botany at the University of Washington. Her master's thesis will be written on the endangered species *Trifolium thompsonii.* Her attendance last year at the Symposium was sponsored by the Arboretum Foundation. The drawings by Sally Dickman in this article represent some of those plant families most frequently exploited by plant collectors.

is less than four years old. The Endangered Species Act of 1973 states that the federal government "should provide for the conservation of all endangered and threatened species of plants and animals and the ecosystems upon which they depend, throughout the world." This Act directed the Smithsonian Institution to submit a list of endangered and threatened plant species of the United States to Congress in 1974, along with recommendations for preserving such plants. A summary of the Smithsonian's original findings appears below:

Status	Number of taxa	Percent of Native Flora
Extinct	100	0.5
Endangered	761	3.8
Threatened	1,238	6.1
Total	2,099	10.4

These figures exclude Hawaii, where a total of 1,088 out of 2,200 taxa qualified for the list.

Recommendations by the Smithsonian which accompanied the endangered list include the following:

1. *In situ* preservation to be favored over cultivation.
2. Mapping of the habitats of endangered and threatened species.
3. A permanent endangered register to be established and updated.
4. Research into causes of rarity.
5. Protection and management of endangered species to be instituted in compliance with government agencies.
6. Commercially exploited species to receive immediate attention.
7. Wide publicity for the endangered list and report.

The agency with primary responsibility for implementing federal endangered species regulations is the Department of the Interior's Office of Endangered Species. The Office published protective statutes last June (scheduled for implementation in August) which apply to the 1,767 plant taxa considered endangered on the Smithsonian's revised list, also released in June. These regulations are aimed at preventing federal agencies from interfering with endangered species or habitats critical to their survival, by requiring surveys of federal lands prior to changes in land use. While collection of listed species is not forbidden by the statutes, interstate sale of such plants is prohibited.

Cypripedium montanum, **an orchid native to the western United States.**

In considering federal efforts to save endangered plants, the need for local involvement quickly becomes apparent. Botanists and plant enthusiasts familiar with their local flora are best qualified to determine the status of endangered plants. They can exert the most effective pressure on local government or business authorities to protect the flora. This theme was emphasized at the symposium both by spokesmen for the federal government and by regional experts.

Dr. Ken Chambers of Oregon State University discussed progress in the northwestern United States. Preliminary endangered plant lists have been compiled over the past several years. He emphasized the need for organization on the state level to implement protection for endangered species. On the other hand, because of the large amount of federally owned land in our region, much of the burden still rests with the Interior Department. No state-level legislation now exists, nor is any funding provided for the study or management of endangered species.

In Washington, the list of threatened and endangered plants of the state, compiled by Dr. Arthur Kruckeberg, comprises our main resource on the subject. South of us, the Oregon Nature Conservancy is compiling an inventory of natural areas, many of them supporting endangered

The growth habit of a tree fern.

species, with the intention of purchasing and preserving critical areas. Dr. Chambers recommended more fieldwork to refine the preliminary lists in our region, fieldwork necessarily carried out on a volunteer basis by individuals familiar with the local flora. (For a discussion of state efforts in the Northwest, see article compiled by Nancy Walz on P.17.)

Other regions of the United States vary in their progress regarding endangered plants. In the Intermountain area, state legislation does exist. Some state agencies in that region are uncooperative, however. Viewing federal legislation designed to protect endangered plants as an infringement of states rights, they effectively block federal funding and assistance. Coordination between botanists and state officials was recommended in the hope of applying tenets of the Endangered Species Act to state legislation.

The Southwest's representative to the symposium emphasized educating the public to recognize endangered species. In the Southwest, regulations requiring permits for the collection of endangered cacti and orchids are ineffective. Citizen awareness is hoped to be a more powerful curb on the destruction of exploited species than are unenforceable laws. California's Native Plant Society provides the best example of organized citizen effort on a statewide level. Society members monitor the local status of endangered plants and lobby for habitat preservation.

In the eastern half of the country, pressure from development is perhaps the most severe threat to plants. Natural area programs have proven successful in saving critical habitats. Legislation prohibiting wildflower-picking dates from the 1860's in New England. Not surprisingly, no offender has ever been jailed or fined as the law required; again, regulations prove to be unenforceable.

Thus, efforts to save endangered plants are obviously getting underway in most states in this country. The example of federal legislation should encourage local action. Successful groups such as the California Native Plant Society already provide models for other states: the newly organized Washington Native Plant Society is a prime example (see Dr. Kruckeberg's accompanying article for details on the Society, P. 22).

Sympathy for endangered species is generally lacking in Latin America. Lack of botanical expertise and an exploitative attitude toward the native vegetation allow little hope for endangered species. Regarding the former, only a small number of botanists are at all familiar with Latin American plants. Virtually no floras exist for those countries; the few works available are usually written in English rather than the native language. Vast regions have never been explored by botanists, areas quite certainly rich in endemic species (those species restricted in distribution). Many Latin American botanists see no possibility of compiling threatened species lists for such regions, however; rare species are probably being destroyed more rapidly than they are being discovered.

The most serious threats to Latin American plants are: bulldozing and burning jungles for timber, charcoal production or development of agricultural land; overgrazing by sheep and other animals; mining and oil exploration and development, with resulting pollution; dam construction or draining of swamps; exploitation of native plants for food, craft purposes, export or sale to tourists.

Approaches of Latin American governments toward endangered species range all the way from an enlightened conservationist attitude to complete disregard of the problem. Most governments understandably pay little attention to the cries of conservationists. In the short run,

higher priority must go to feeding a rapidly increasing population, which often means replacing rich tropical forests with crops. Venezuela provides an encouraging example, however, with its well developed system of national parks, refuges and forests reserves; personnel are given conservation training. Even so, collection of plants in parks is permitted and, as always, enforcement of conservation regulations is difficult. In Central America, Audubon Society preserves bolster local efforts. Some areas, like Haiti, were so altered by Europeans four centuries ago that no natural forests now exist on the island. Farther south, in Amazonia, botanical research carried out locally is helping to prove to farmers the economic benefits of practices less destructive to native vegetation than cutting down the entire forest.

The Latin American botanists speaking at the symposium offered their recommendations for further action on endangered species. Education of the public was most often cited: sending university students out to local people, encouraging them to take pride in their natural heritage. Government attitudes should give more attention to conservation instead of exploitation for the tourist industry. Outside expert assistance is needed in most parts of Latin America; cooperation with organizations like the New York Botanical Garden can bring trained botanists to those countries. Preservation of representative areas of natural vegetation is considered a more effective approach than seeking out and cataloging individual endangered species. A few large preserves are more desirable than many small ones, however. The refuge must be large enough to support the animals responsible for pollination and dispersal of the plants under protection.

Some problems cited at the symposium are peculiar to tropical regions, especially in regard to land development practices. Selective cutting or partial clearing practices cannot be applied to tropical systems because of the diversity of forest tree species. When only several trunks of species desirable for timber grow in a heavily forested area, clear-cutting is the only practical means of removing the desired trunks. Once the canopy of the jungle is removed, the soil is quickly eroded and converted to a useless hardpan.

Reforestation programs presently rely largely on fast growing introduced species, such as eucalyptus or pine. If poorly trained personnel plant these genera without considering their habitat requirements, the results can be disastrous. For example, a tree species native to warm lowlands may not survive when planted on a mountain slope, where the climate is cooler and wetter. In addition, many native animals and understory plants cannot adapt to life in the habitat of an introduced monoculture.

On the other hand, reforestation with non-native eucalyptus or pine does relieve the pressure on native vegetation. In the Andes, timber is particularly scarce. Endemic cushion plants are collected for fuel if timber is not replanted locally. A pragmatic approach to the preservation of natural vegetation is clearly needed.

In addition to the above discussion of efforts to save plants in countries of the Americas, a number of specialists on particular plant groups presented a slightly different view of the situation. The orchid family is an obvious case in point.

About 25,000 orchid species are thought to exist in the world, most of them specialized for a tropical environment. Their diversity in the American tropics is incredible: up to 300 individual orchids can live on a single tree; 48 species have been found on one tree in Venezuela. This emphasizes the threat that timbering poses to orchids. Their specialized requirements for pollinators, symbiotic fungi and habitat indicate once more the need for large-scale habitat preservation. The threat to epiphytic, or

***Pediocactus simpsonii*, native to eastern Washington.**

tree-dwelling, orchids is illustrated by what has happened in Costa Rica: within the past 20 years alone, a full quarter of the native forests have been cut down. Loggers ordinarily burn the tree-tops where epiphytes grow. Because orchids are collected so extensively for export and the tourist industry, publicity of the whereabouts of endangered species in the tropics may be unwise. The rarer an orchid, the greater its value to the collector. An appropriate policy is to encourage the cultivation and artificial hybridization of orchids for commercial purposes.

Another plant group given special attention at the symposium was the ferns. Although many species are quite widespread because of their highly mobile spores, just as many are restricted endemics. Tree ferns have been the most commercially exploited.

Palms are a third group of exploited plants, widely collected for sale to tourists. Ofen small palms are topped, effectively killing them; the dying heads are then sold with the false assurance that they will survive in cultivation.

Cacti, like orchids, are desirable because of their rarity. They are naturally protected from exploitation in several ways, however. They often grow in inaccessible places and their spines help dissuade collection. Many are difficult to identify or cryptic; one species of *Pediocactus* normally shrinks entirely below ground level during the summer.

One additional important topic addressed at the symposium was the interest of international organizations in endangered plants. The Threatened Plants Committee of the International Union for the Conservation of Nature (IUCN), an independent organization, is perhaps most active in this field. Cooperative programs and funding for botanical gardens and university research bring aid where progress would otherwise be extremely slow. Regional committees and specialists in exploited plant families are attempting to assess the endangered species problem throughout the world. The IUCN representative emphasized the urgent need for programs in the American tropics, considering the rate of destruction of native forests there. Horticultural research is especially important to determine a means of propagating and maintaining populations of endangered plants.

The symposium was considered quite successful by those who attended. Mutual recognition of problems by botanists from so many nations helps to support the efforts of individuals throughout the hemisphere. The attitude of cooperation between representatives of these countries was also encouraging. Botanical knowledge and experience in dealing with endangered species in this country can benefit less developed nations. Beyond the understanding shared by the professional scientists at the symposium, all of us interested in plants can be assured of the need for our involvement. A concerned public and organizations dedicated to learning about and preserving our flora are the best tools for insuring its survival. ▲

---

*Genetic Reservoirs**

All species, as we see them today, are the products of countless years of evolution which has determined the genetic constitution of every living form. These genes, embodied in populations of species, are essentially reservoirs of unique "genetic information" which controls numerous transfer activities in ecological processes.

Every species' population is a kind of "memory" that "knows how" to perform parts of processes that are important to the support of Earth's biosphere, and hence to support of man.

Every form of life, and thus any genetically-determined process, can become extinct. If a species becomes extinct, therefore, a unique genetic pool disappears and some ecological processes are altered or vanished forever.

An endangered species can mean an endangered process, an endangered community, an endangered ecosystem, an endangered mankind. We would do well therefore to consider the importance of process in our current land-use practices.

*Reprinted from *Washington Wildlife, Vol. 28, No. 2,* from an article by Robert A. Mowrey.

THE ARBORETUM AND ENDANGERED PLANTS

JOSEPH A. WITT
Curator of Plant Collections

What role may arboreta or botanic gardens play in saving endangered or threatened plant species? This topic has been debated at some length by botanic garden personnel who seem to be arrayed into two general camps: those who feel that their gardens should make every effort to cultivate all of the endangered species they can with an aggressive attempt to introduce those plants, and those who feel that this may be an exercise in futility. While the latter may be willing to grow endangered plants in their collections, they do not wish to go to extreme lengths in introducing them. The federal act protecting endangered plants seems to agree with this viewpoint since its first recommendation reads: "Preservation of endangered and threatened species of plants in their native habitat should be adopted as the best method of ensuring their survival. Cultivation or artificial propagation of these species is an unsatisfactory alternative to *in situ* perpetuation and should be used only as a last resort, when extinction appears certain, with the purpose of reestablishing the species in its natural habitat."

The University of Washington Arboretum has never developed a strong philosophy on this subject in line, I suspect, with the majority of gardens. However, we do have a policy of acquiring endangered plants under certain circumstances. First, they must represent plants that are useful to the collections and secondly, they must be available without further endangering the population. In other words we are not, as yet, deliberately growing a plant merely because it is endangered in the wild.

Of the some 1700 plants of the United States that are on the Endangered and Threatened Species List published in the Federal Register Part IV, June 16, 1976, there are about 50 woody species that might grow in the Arboretum. Of these, we now have 11. To bring this a bit closer to home, there are only 18 plants from Washington currently on the endangered list and of these only *Petrophytum cinerascens,* the Chelan Rockmat, which we have tried and lost, could be considered woody. The rest are all herbaceous. Most of them are from the dry country of central or eastern Washington and would be difficult to grow under Arboretum conditions. Hence it seems unlikely that the Arboretum will take an active role in growing many of these species without special encouragement.

The list of threatened plant species for Washington, that is those species which are not now in great danger of extinction, but may well be if they do not receive some form of protection, is more extensive with 71 plants on the 1976 list. Of these, only five are woody and to date none are growing in the Arboretum. We have tried several in the past, but all are now dead. We might be able to grow one or two others with some hope of success if we could find a source for them.

It might be interesting to take a closer look at a few of the Arboretum's collection of endangered plant species to see what they are, how we received them and how they are doing in the Arboretum. First those from the American list.

Arctostaphylos andersonii var. *pallida*. This manzanita is a moderately tall-growing green-leaved plant with red-brown stems, white urn-shaped flowers and bright red fruit native to the hills of Alameda and Contra Costa counties, California. In the Arboretum, it has been growing on a west facing slope near the head of Rhododen-

Arctostaphylos auriculata **Photo: E.F. Marten**

dron Glen since 1947. The Arboretum acquired its seeds in 1941 from A.E. Weislander of the University of California, Berkeley. Unfortunately, the plant is suffering from a leaf disease which has troubled several other nearby manzanitas and may cause its death unless we find a control measure soon.

Arctostaphylos auriculata. This Californian is native to the chaparral of Mt. Diablo. In the Arboretum it has been very successful, forming a tall open shrub with gray-green leaves and pink bell-like flowers. The plant came originally from L.L. Edmunds, a native plant collector in California in 1947 and has been growing near Rhododendron Glen for 28 years.

Arctostaphylos densiflora. The Sonoma Manzanita is found in a very limited area near Santa Rosa, California. It is a low-spreading green-leaved shrub that has been slightly tender with us. There are four named cultivars of this plant growing in the Arboretum, selected by the Saratoga Horticultural Foundation. Several of them were planted in 1960.

*Cupressus abramsiana.** Santa Cruz Cypress from the slopes of the Santa Cruz Mountains in California was grown from seed received from the Rancho Santa Ana Botanical Garden in 1949. Several plants east of the office along the Broadmoor fence are now nearly 50 feet tall and

have been producing cones and seeds for several years.

Franklinia alatamaha. The story of this small tree is well known and will not be repeated in detail here. Briefly the plant was discovered near the Altamaha River in Georgia in the latter half of the 18th century. Live specimens collected by the Bartrams were introduced into cultivation before 1800. Descendants of these are probably the only living specimens now extant since no wild plants have been seen for over 150 years. The Arboretum's plants are growing in the Camellia Collection and along Azalea Way. Unfortunately we have no record of when the larger ones were planted, but it was over 30 years ago. The *Franklinia* is an example of a species that would have become extinct if there had not been a horticulturist to recognize its merits and to see that it was introduced into gardens. Several other plants fall within this category: *Ginkgo* would be one; *Metasequoia,* Dawn Redwood, may well be another.

Taxus floridana. This yew is restricted to the area of the Apalachicola River in northern Florida. It is a smaller plant than our native *T.*

Cupressus abramsiana **Photo: Nancy Walz**

Photo: William Eng

Franklinia alatamaha

brevifolia, but otherwise seems very similar. One plant was sent to us by a Pennsylvania nurseryman in 1957. It is growing reasonably well near the Lookout.

Viburnum bracteatum. A deciduous viburnum from Georgia, it grows on the banks of the Coosa River. We received one plant of it in 1962 from the Morton Arboretum in Lisle, Illinois. It has not been planted in the Arboretum as yet, but is still in the nursery. This species has attractive shining green foliage, but we have no record of its flowering or fruiting.

So much for a sampling of endangered American plants in the Arboretum. There is also a draft list of European plants developed through the auspices of the International Union for Conservation of Nature and Natural Resources. The woody species on this provisional list amount to 86 of which the Arboretum has 10 in its collections. Since the European list uses somewhat different criteria for judging whether a plant is endangered or not, it seems probable that many of the 10 species we are growing would not be considered endangered by American standards. If we eliminate all categories except for those endangered, i.e. those plants which are actually on the verge of extinction, we then find the Arboretum has only one plant from the European list. This is *Abies nebrodensis*, Sicilian Fir, a native to Sicily where, according to *Flora Europaea*, there are only about 20 living trees still extant. We raised our plants from seed received from the Arboretum des Barres, Loiret, France in 1954 and 1959. The largest plants are now 25 feet tall and are making handsome young trees rather similar to the European Balsam Fir, *Abies alba.*

Obviously botanic gardens and arboreta have a role in saving endangered plants, a role similar to that of zoos in the protection of endangered animals. The Arboretum is serving in a small way as a repository for some of these species and will make them available to the appropriate agencies if and when needed, either for repopulating their original home or for further propagation to ensure that they do not ultimately perish from this world.

---

* The species and varieties of *Cupressus* in the Arboretum have recently been the subject of an illustrated article by Brian O. Mulligan in the 1975 *Year Book* of the International Dendrology Society, published in London, April 1976. A copy of this publication is in the Arboretum library.

Two other Californian species equally as rare in nature as *C. abramsiana* are now well established in the Arboretum, namely *C. goveniana* from Monterey County and *C. stephensonii* from San Diego County.

B.O.M.

REVEGETATION IN THE SUBALPINE ZONE

JOSEPH W. MILLER
and MARGARET M. MILLER *

As man's use of the fragile areas of the earth increases, the need for their repair and restoration becomes ever more apparent. Here in the Pacific Northwest, the land-management agencies are particularly concerned with human impact on the vegetation of the alpine and subalpine zones. Washington has relatively few alpine and subalpine meadows in comparison with other regions such as the Rocky Mountain states. This is markedly true in the North Cascades where the extreme topographic relief limits such meadows to a few locations.

These high elevation flowering meadows have proven to be such an attraction to visitors during the hiking-climbing-backpacking boom in the years since World War II that they have suffered severe damage. When our state's new North Cascades National Park was created in late 1968, its administrators realized that the alpine and subalpine meadow habitat types within the park's boundaries were both rare and endangered.

Cascade Pass, one of the scenic climaxes of the North Cascades, was probably the most heavily damaged subalpine area in the new park. Only six km from a roadhead, by easy trail with an elevation gain of only 550 m, it was a terminus for thousands of hikers during each summer season. Many years of unrestricted camping had severely impacted the fragile vegetation. Hunting parties had tied horses to the ancient mountain hemlocks, wearing away the soil at their bases, and had shovelled out tent platforms in the meadows. Large climbing parties, with their heavy boots and cleated soles and their proliferating campfire sites, had often been equally damaging to the vegetation.

Thornburgh (1970) studied the Cascade Pass problem for the Park Service during the park's first summer. He mapped the areas of bare soil, both campsites and trails, and described the principal vegetation types. On the basis of his management recommendations, administration closed the area to all fires, camping and horse travel in the 1970 season.

In August of that year, then Superintendent Contor held a staff meeting on Cascade Pass attended by all park personnel concerned with its management. As volunteer research biologists who had worked in other areas of the park, the writers were invited to participate. As a result of the discussion, we were instructed to begin immediately to attempt to revegetate the impacted areas of the pass with native plants by any practical means.

Douglas (1969) had outlined the general successional trends on the meadows in Cascade Pass as follows: *Carex nigricans* as the pioneer species followed by seral stages of *Luetkea pectinata* to *Vaccinium deliciosum* to *Phyllodoce empetriformis* ending with the climax mountain hemlock-silver fir forest. However, Thornburgh (1970) found that on bare compacted soils, *Luetkea* appeared to pioneer, and on loose disturbed soils, *Carex spectabilis* was the dominant pioneer species.

Both Thornburgh and Douglas had made recommendations regarding possible revegetation,

*The *Bulletin* is very pleased that the Millers have agreed to share their experience at Cascade Pass with our readers. They are founding members of the Washington Native Plant Society (P. 22). Margaret Miller is a past chairman of the Unit Council Greenhouse and a key member of their native plant study groups.

and we have followed all their suggestions as well as techniques we devised ourselves. Literature searches disclosed that many plant ecologists had studied the alpine and subalpine flora of the Pacific Northwest but that almost no one had undertaken the extremely long-range project of trying to restore high elevation areas where the plant cover had been destroyed. What little work had been done involved the use of non-native seed mixtures which were not suitable for our use.

Six years later there is increasing evidence of interest in the revegetation of impacted alpine and subalpine areas. Of particular note are the proceedings of the Workshop on Revegetation of High-Altitude Disturbed Lands held by Colorado State University in 1974. These papers contain much valuable information, although emphasis is still on seeding with commercial mixtures.

Our first problem in September of 1970 was to find seed sources to carry out the seeding experiments suggested by Thornburgh and Douglas. Almost all plants in subalpine areas are perennials rather than annuals and thus need not depend on the production of seeds for their survival. Adverse weather conditions may even prevent the ripening of seed in some seasons, and the viability of planted seed is uncertain at best. To some extent our seeding experiments depended on what species were available.

We planted actual or estimated numbers of seeds in nine half-meter square test plots on each of the four cardinal aspects. Species used were *Arnica latifolia, Carex nigricans, C. spectabilis, Cirsium edule, Epilobium angustifolium, Luetkea pectinata, Lupinus latifolius* (alpine ecotype), *L. latifolius* (subalpine ecotype) and *Saxifraga ferruginea*. The test plots were cultivated to a depth of 7.5 to 15 cm and peat moss was dug into the loosened soil. Following cultivation and planting, the plots were mulched with a thin layer of peat moss, and the surface was firmed.

In addition to the controlled tests, we cultivated four of the large bare campsites, planted them with broadcast mixtures of seeds of 13 different plants and mulched the areas with peat moss. Species used were those listed above for the test plots plus *Erigeron peregrinus, Mimulus lewisii, Potentilla flabellifolia, Valeriana sitchensis* and *Veratrum viride*.

In 1970 we also completely planted one of the large bare campsites with 106 plugs 8.7 cm in diameter of *Luetkea pectinata* on a random pattern of about 30 cm spacing and placed 34 plugs of mixed meadow vegetation, mainly *L. pectinata, Potentilla flabellifolia* and *Carex spectabilis,* in some of the abandoned trails. The following year 59 more of these circular plugs of mixed vegetation were placed in the old trails

The Millers conducting vegetation trials at Cascade Pass, September 1976.

Photo: Joseph W. Miller

Photo: Joseph W. Miller

Mrs. Miller transplanting *Luetkea pectinata* on Cascade Pass.

and marked with stakes and white nylon cord as a deterrent to hikers.

Beginning with the 1971 season, we began carrying down from the pass cuttings and divisions of *Carex spectabilis, Luetkea pectinata* and *Sibbaldia procumbens* to attempt their propagation at a lower elevation. Success being reasonably good, this process was expanded in subsequent years.

Starting with the year 1973 the excellent propagating facilities of the Arboretum Foundation Unit Council's Patricia Calvert Greenhouse were used for this experimental work. Quantities of *Luetkea, Sibbaldia, Cassiope mertensiana* and *Phyllodoce empetriformis* were treated with Hormodin 3 (.8% indolebutyric acid) and inserted in a mixture of 1 part sand, 1 part peat moss and 1 part perlite. They were placed under intermittent mist with bottom heat (soil temperature of 21°C). Following rooting they were planted in standard nurserymen's plastic bedding trays and carried over the winter in the Unit Council's lath house and our own unheated home greenhouse.

In September 1974, 159 trays of rooted plants were transported to Cascade Pass in wooden fruit boxes lashed to pack frames. Four friends of the writers carried 17 fruit boxes weighing 154 kg from the road end to the pass and helped to plant the material. Survival results from this mass planting, in spite of the drought conditions of September and October 1974, were sufficiently favorable to induce the Park Service to build an unheated polyethylene-covered cold frame measuring 1.22 by 3.66 m at Marblemount. This simple propagating facility contained 24 flats filled with a rooting medium adapted from the Cornell University artificial soil mixture with perlite substituted for vermiculite. The writers stocked the flats with cuttings and division of *Carex nigricans, Luetkea pectinata* and *Sibbaldia procumbens* in September 1975. A rooting hormone (Rootone No. 10, .4% Alpha Naphthyl Acetamide) was used on all material. In August 1976, the flats, which by then were solid mats of vegetation, were dumped out into plastic bags and carried by the park's back-country rangers and the writers to Cascade Pass for planting.

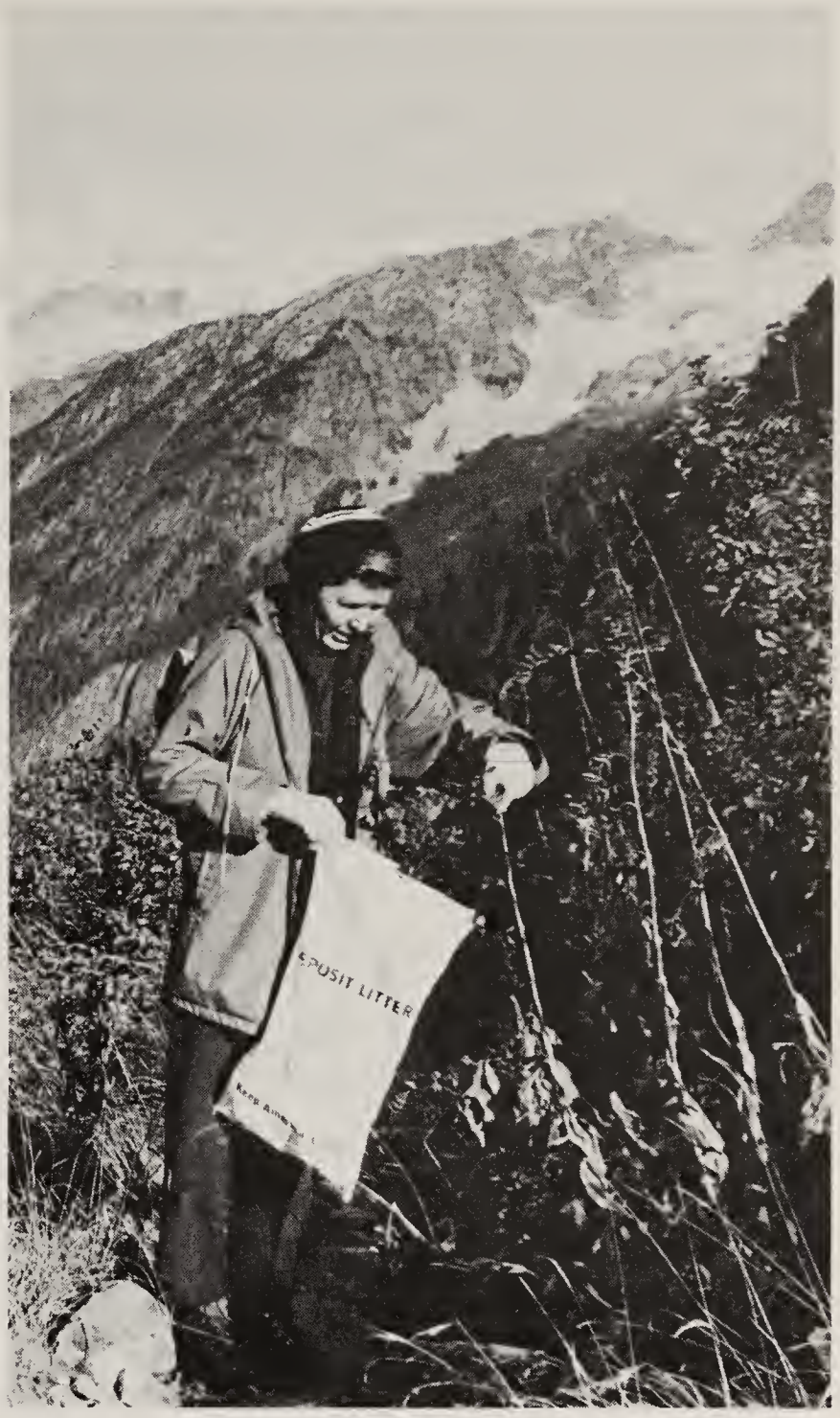
Results of our seven years' work at Cascade Pass are somewhat difficult to analyze. Gardening at sea level is difficult enough to measure scientifically. With the adverse weather conditions and the many variables of Cascade Pass, we can make only preliminary conclusions.

Only one aspect of our four sets of test plots of seeding shows any degree of success, even though we replanted them in 1971. Vandalism by illegal campers contributed to the lack of success, but the major problems appeared to be the lethal summer soil temperatures, found to be as high as 49°C in a similar area by Ballard (1972), and the severe moisture stress in the summer

months (Brink, 1965). *Carex nigricans* was the most successful species in the one successful plot, more shaded than the other three.

In two of the large bare campsites treated by broadcast seeding there was no response. The other two, better watered and more shaded, have given us good to excellent results. These sites after six years have from 50 to 75 percent cover, principally of *Carex spectabilis* and *C. nigricans*, with subordinate quantities of *Luetkea pectinata, Potentilla flabellifolia, Saxifraga ferruginea, Valeriana sitchensis* and *Veratrum viride*. Generally we conclude seeding is practical only on well-watered sites, few of which exist at Cascade Pass, that deep digging is necessary to counteract soil compaction and that burlap netting over cultivated seeded areas is helpful in preventing wind and water erosion and in providing some shade and moisture control. *Carex* seed seems the most suitable, provided ripe seed can be obtained.

We are currently experimenting with growing *Phleum alpinum* (alpine timothy) at our home in Bellevue from seed. This is a rather aggressive native grass used with success in Glacier National Park, and we have considerable hopes for its use on disturbed sites. Seeds from one clump brought down from Cascade Pass in 1975 were sown in a small flat when ripe and resulted in a harvest of 71 panicles by the summer of 1976. Germination tests of the seeds show 48 percent viability, and we should be able to develop a sub-



Mrs. Miller collecting seeds on trail to Cascade Pass (above) and measuring growth of plants in test plot, September 1976 (below). Photos: Joseph W. Miller

stantial seed source in one more year.

We have found transplanting of adjacent vegetation to denuded areas to be a serviceable technique in most cases. Survival rates of material dug with a small (15 cm broad) shovel were much better than the circular 8.7 cm plugs (96.6 percent as compared with 49.7 percent). *Carex* species, *Luetkea pectinata* and *Potentilla flabellifolia* seem the species best suited to transplanting and provide the most rapid coverage of bare areas. It is essential to refill with soil the holes where the plants are dug. Since there is no soil source, it is necessary to carry the soil dug from the denuded area back to the undisturbed site. Undisturbed meadows are so scarce on Cascade Pass that we have for all practical purposes ruled out transplanting as a revegetation technique there.

Although obvious logistical problems are involved, the propagation of plant material at lower elevations for replanting at Cascade Pass seems to offer the most promise. Survival rates are high, 84.8 percent after two years, and growth is reasonably rapid. We have had the most success with *Carex nigricans, Cassiope mertensiana, Luetkea pectinata, Phyllodoce empetriformis, Saxifraga ferruginea, Sibbaldia procumbens* and *Tsuga mertensiana*. Because of their rapid growth and resistance to trampling, the *Carex, Luetkea* and *Sibbaldia* probably are best suited for revegetation purposes. Klickoff (1965) observed that *Carex* species had the best rates of growth under drought and high temperature conditions of any other timberline species tested. Since many of the problem areas at Cascade Pass suffer from these limiting factors, *Carex nigricans* and *C. spectabilis* should be of especial value.

The Park Service administration concurs with our evaluation of the various revegetation techniques tested and is currently constructing a plastic-covered A-frame greenhouse at Marblemount. This unheated propagating facility will also be used to grow plant material for other impacted subalpine areas in the North Cascades National Park such as Whatcom Pass, Park Creek Pass and Copper Ridge.

Cascade Pass, beautiful but badly worn when we first visited it, is now showing a quite remarkable recovery. The revegetation work we have done in our 20 trips to the pass in the last 7 summers has been only one factor in this restoration. Closing the area to fires and camping has greatly relieved human impact and permitted some natural recovery to occur. Jute netting placed by the Park Service on bare campsites and old trails has provided shade, moisture and erosion control and has helped deter trampling. The revegetation projects complement the Service's efforts to lessen human impact and make more reasonable to the visitor the no-camping regulations. Hopefully, another decade of work will bring Cascade Pass back to an approximation of its original pristine condition. ♦

REFERENCES:

Ballard, T.M. 1972. Subalpine Soil Temperature Regimes in Southwest British Columbia. Arctic and Alpine Research 4(2):139-146.

Berg, W.A., J.A. Brown and R.L. Cuany (Eds). 1974. Proceedings of a Workshop on Revegetation of High-Altitude Disturbed Lands. Environmental Resource Center, Colorado State University, Ft. Collins, Colorado.

Brink, V.C. 1964. Plant Establishment in the High Snowfall Alpine and Subalpine Region of British Columbia. Ecology 45:431-438.

Douglas, G.W. 1969. A Preliminary Biological Survey of the North Cascades National Park and the Ross Lake and Lake Chelan National Recreation Areas. Unpublished report prepared for the National Park Service. On file Sedro Woolley, Washington.

Klickoff, L.G. 1965. Photosynthetic Response to Temperature-Moisture Stress of Three Timberline Meadow Species. Ecology 46:516-517.

Miller, J.W. and M.M. Miller. 1970, 1971, 1972, 1973, 1974, 1975. Revegetation Experiments in Impacted Subalpine Plant Communities at Cascade Pass, North Cascades National Park. Unpublished reports prepared for the National Park Service. On file Sedro Woolley, Washington.

Thornburgh, D.A. 1970. Survey of Recreational Impact and Management Recommendations for the Subalpine Vegetation Communities at Cascade Pass, North Cascades National Park. Unpublished report prepared for the National Park Service. On file Sedro Woolley, Washington.

*What's Happening In the Pacific Northwest...**

The Pacific Northwest's efforts to protect rare, threatened and endangered species of plants ultimately depend on the preservation of the eco-system in which they live. This concept is implicit in the steps that have been taken in Oregon, Washington and Idaho on federal, state and independent levels.

The federal government initiated a nationwide Federal Research Natural Area system 45 years ago. The Interagency Committee for Research Natural Areas (RNA's) is composed of representatives from such agencies as the Forest Service, Park Service, Bureau of Land Management and the President's Council of Environmental Quality. It has set aside tracts of land on which both common and unusual organisms are preserved to serve as baseline areas, field laboratories and genetic reservoirs for the scientist, the resource manager and the public.

Although most such preserves focus on ecosystem or community preservation, some are set aside with the specific intent of preserving a particular species and its habitat. In Oregon the Brewer's Spruce and Coquille River Falls RNA's were established for *Picea breweriana* and *Chamaecyparis lawsoniana* respectively, both regionally endemic trees. The Wheeler Creek RNA in southwestern Oregon recognized the need to preserve a gene pool at the periphery of its range; the coast redwood, *Sequoia sempervirens,* is near its northern limit here. In Washington one RNA is being set aside to protect a non-arboreal species, *Trifolium thompsonii.*

The approximately 50 federally managed RNA's located in Washington and Oregon (Franklin, et al, 1972) have been established on the basis of the goals set forth in a publication, "Research Natural Area Needs in the Pacific Northwest" (Dyrness, et al, 1975). The capture of

*This article was compiled by Nancy Walz, Editorial Assistant, from a paper written by Dr. A.R. Kruckeberg, Department of Botany, University of Washington, which he presented to the North Cascades: Environmental Symposium in Bellingham (Western Washington State College), October 1 and 2, 1976.

A grove of *Chamaecyparis lawsoniana* in Josephine County, Oregon.

Photo: Brian O. Mulligan

S. Dickman

additional RNA's is a slow process of identification, inventory, review and acceptance by the relevant agency, but each year new ones are created.

Federal support has made it possible for Dr. George Douglas to conduct an ecological survey of potential natural areas in the North Cascades National Park (Douglas, 1971). Through his field work on Sunrise Ridge, Chowder Ridge, Green Mountain and elsewhere in the North Cascades, he has discovered significant range extensions of rare plants into Washington from the north and east.

On the state level, legislation was enacted in 1972 to set up a Natural Areas Preserve System for the state of Washington separate from the federal system of RNA's. The Department of Natural Resources (DNR) was designated as the managing agency. When the Governor was requested by the Department of Interior to choose an agency to implement the plant section of the federal Endangered Species Act of 1973, he selected the DNR to fulfill this separate function as well.

A Natural Areas Advisory Committee works through the DNR to identify and establish natural areas outside federal ownership, but using the above mentioned guidelines set forth by Dyrness, et al.

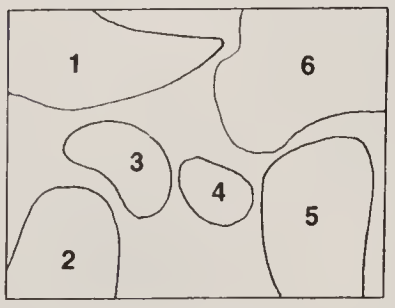
A citizen's task force has also been formed under the direction of John Wirsing from the DNR. Although still in the planning stage, one of their major activities includes a detailed inventory of the state's unusual plant species based on field studies by a combination of volunteers: amateur naturalists, conservation societies, field personnel of various public agencies and graduate student botanists. Two workshops are planned for spring 1977 at Pullman (Washington State University) and in Seattle (University of Washington) to assist field personnel of federal and state agencies in reporting on the status of rare plants.

In Idaho* cooperative ventures to identify research natural area needs and to list the disjunct and endemic plants of the state are well under way (Wellner and Johnson, 1974; Steele, 1975). In 1974 through the University of Idaho a natural areas workshop was held in Boise which set up seven natural areas technical committees and a coordinating committee. These groups published a first estimate of natural areas needs for the state in the winter of 1975. The following spring a second workshop was held, and most recently an Idaho Natural Areas Council was formed to give guidance, direction and support to the volunteer efforts of the technical and coordinating committees.

There is still an enormous task ahead as pointed out by Dr. Henderson: "When one can drive to the end of a rough mountain road that has been in existence for over 100 years and encounter an unnamed native flowering plant, that's certainly an indication of our ignorance of the flora of our relatively inaccessible areas."

Independent conservation groups can have a far-reaching effect on the preservation of plant life. They may act either by direct establishment of preserves, or by influencing the public or private sectors of society to set aside such preserves. On a national level, the Nature Conservancy has carried on the most sustained program of natural area preservation. Some of their preserves have included unusual organisms. The Moxee Bog on the Lower Yakima River, Washington protects the only locality of the butterfly, the Silver-Bordered Fritillary. In Idaho, in cases where rare species were found on private land, the Nature Conservancy has been effective in pushing for the plants' protection.

In recent years native plant societies have organized around two complementary themes: the appreciation and enjoyment of native plant life



The composite drawing by Sally Dickman on the preceding pages illustrates the following species:
1. *Picea breweriana* has its own RNA in southwest Oregon.
2. *Darlingtonia californica* is an insect-devouring species protected in a typical bog habitat in Florence, Oregon.
3. *Kalmiopsis leachiana* is an ericaceous rockmat for which a wilderness area in southwestern Oregon is named.
4. *Campanula piperi,* a crevice-dwelling miniature, is an endemic of subalpine areas in the Olympics.
5. *Trifolium thompsonii* is restricted to a small area in eastern Washington, where an RNA is being set aside for it.
6. *Chrysolepis chrysophylla* is common in western Oregon and California but is represented by only two or three stands in Washington, its northernmost limit.

*Douglass Henderson, Department of Biological Sciences, University of Idaho. Private communication.

and the preservation of native species — both rare and not so rare. The Washington Native Plant Society was established in 1976 with these objectives. The Oregon Rare and Endangered Plant Species Task Force, under the leadership of Jean Siddall, is well along towards the completion of a statewide inventory of that state's rare plants. They are now embarked on validation in the field of their basic inventory.

The private sector of society — business, industry and individual property owners — is often in conflict with the survival of an unusual ecosystem. Logging, mining, roadbuilding, farming and grazing are some of the activities which can hasten the destruction of any natural community. This is where governmental agencies and independent groups in the Pacific Northwest can exercise their clout. If environmental impact statements, for instance, disregard rare and endangered species, and if persuasion or cooperation prove futile, then legal coercion is necessary to protect a loss of habitat for a rare organism.

What still needs to be done?

Before setting aside more habitats containing rare plant species, the Northwest's biological inventory must be broadened. The first lists of endangered and threatened plants prepared for Washington and Oregon (Dyrness, et al, 1975) are from herbarium specimens which, in fact, tell us little about the current distribution and vitality of those plants in their native habitats.

Once an area has been identified as a potential RNA, transferral of ownership to a management agency skilled in preservation and protection may be necessary. This will require substantial land acquisition from both public and private sources.

The federal Endangered Species Act of 1973 has power only to prohibit the interstate sale of endangered plants. Since it cannot restrict the collection or sale of them within state boundaries nor their movement between states for private purposes, each state must adopt its own laws in this regard. A survey by the Brooklyn Botanic Garden (Hermann, 1975-76) revealed that only 4 of the 18 responding states had any statutory protection. Once a law is in effect, enforcement is another story, especially in fairly accessible natural areas such as the Tumwater Botanical Area.

Even with the wide attention rare and endangered plants and their ecosystems have received of late, the Pacific Northwest has considerable work to do in transforming the hours of inventory, the politics of persuasion and the drafting of management practices into the acquisition and establishment of research natural areas.

Lewisia tweedyi **is protected in the Tumwater Botanical Area, Washington. Photo: Brian O. Mulligan**

REFERENCES:

Douglas, G.W. 1971. An Ecological Survey of Potential Natural Areas in the North Cascades National Park Complex. Intercampus Educational and Scientific Preserves Committee. Mimeogr.

Dyrness, C.T., J.F. Franklin, C. Maser, S.A. Cook, J.D. Hall, and Glenda Faxon. 1975. Research Natural Area Needs in the Pacific Northwest. A Contribution to Land-Use Planning. Pacific Northwest Forest and Range Experiment Station. U.S. Forest Service General Tech. Rep. PNW-38. Portland, Oregon.

Franklin, J.F., F.C. Hall, C.T., Dyrness, and C. Maser. 1972. Federal Research Natural Areas in Oregon and Washington. A Guidebook for Scientists and Educators. Pacific Northwest Forest and Range Experiment Station. U.S. Forest Service, Portland, Oregon.

Hermann, Jane. 1975. Who's Protecting Endangered Plants? Brooklyn Botanic Garden Record. Plants and Gardens 31:43-45. (Winter, 1975-76).

Steele, R.W. 1975. A Directory to Disjunct and Endemic Plants of Central and Southern Idaho. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, Idaho.

Wellner, C.A. and F.D. Johnson. 1974. Research Natural Area Needs — A First Estimate. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, Idaho.

The Washington Native Plant Society

*ARTHUR R. KRUCKEBERG**

The creation of a statewide organization in Washington for the preservation and enjoyment of native plants is decidedly in fashion! California, Oregon and northern Nevada have active native plant societies, and others are known beyond the Pacific Northwest. This recent activity stems from a broadly based concern for the preservation of our native plant heritage, both the rare, the unusual and the typical. The interest in native plants is international, and focuses on the preservation of the *habitats* where unusual plant species are found.

Recognition of this concern for our native plant life has taken many shapes beyond the formation of state and local native plant societies. For instance, at the federal level, the U.S. Congress passed the Rare and Endangered Species Act (Public Law) in 1973. Although this law first dealt with rare animals, Congress requested the Smithsonian Institution to make an inventory of rare and endangered plants, as well as to make recommendations for their preservation; they were to report back to Congress within a year. The Smithsonian list, first published in 1974, has now been reprinted in the Federal Register, June 1976, and is being reviewed nationally.

So with national focus on the preservation of flora, it is timely that Washington State take up a comprehensive study of its colorful and rich plant life. That is the prime focus of the new Washington Native Plant Society (WNPS).

The WNPS was founded in 1976 following a meeting at the Pacific Science Center early in the year. Present at this initial meeting were amateur and professional botanists from various parts of the state. A steering committee was formed as a result of that meeting; its charge was to establish an interim organization for the society. This committee solicited a dues-paying membership, drafted bylaws, secured articles of incorporation (for tax exemption purposes), started a newsletter, initiated a program of field trips and held one evening meeting. The present and growing membership of around 200 people elected a board of directors in the summer of 1976.

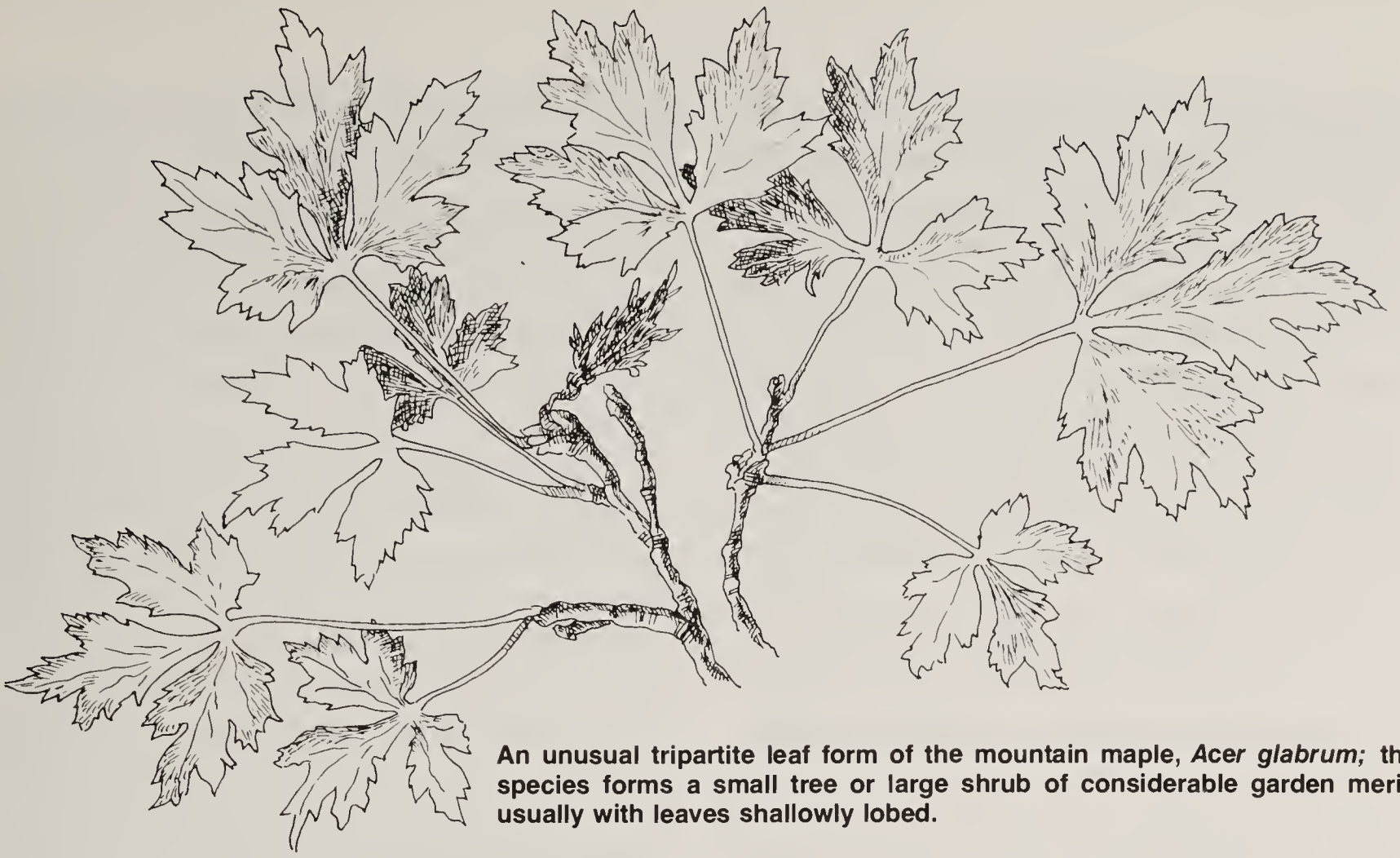
The structure of the society is patterned after that of the California Native Plant Society, which has several local chapters and a full program of field trips, conservation efforts, plant sales and other projects. The idea of local chapters should be emphasized. The real strength of the WNPS will come from each active local membership working within their chapter on programs of education and enjoyment of local plant life, and devoting efforts to preserve samples of the flora. The membership has a broad spectrum of interests and backgrounds: students, teachers, professional botanists, gardeners and amateur naturalists who have joined the society from all over the state. ♦

---

*Dr. Kruckeberg, Chairman of the Department of Botany, University of Washington, is the president of the Washington Native Plant Society and one of its founders.

MEMBERSHIP categories in the WASHINGTON NATIVE PLANT SOCIETY are: Student/Retired $5, Regular $8, Family $10, Sustaining $50. Dues include subscription to newsletter and notification of meetings, seminars and field trips.

To join send name, address and phone number accompanied by your check to: Washington Native Plant Society, Dr. A.R. Kruckeberg, Department of Botany, University of Washington, Seattle, Wa. 98195. Make checks payable to the Society.



An unusual tripartite leaf form of the mountain maple, *Acer glabrum;* the species forms a small tree or large shrub of considerable garden merit, usually with leaves shallowly lobed.

Collecting a Landscape

*B. LEROY DAVIDSON**

A new awareness of the almost infinite variety of native plant materials suited to use in the home landscape has brought attendant problems. Since many of the potential subjects are not readily found in any amount and/or frequency in the nursery trade, the innovator must in many cases go back to nature. If he exercises rational conservation practices, there are legitimate channels to pursue in assembling his own collection.

It would seem self-evident that the native plant species of any area should be the most satisfactory and trouble-free materials to utilize. In the long run the trees and shrubs and flowers of our waysides are certain to prove the most satisfactory as the bones, the woof and warp of our homescapes. Even among the commonplace species there are superior variations to be sought.

In the case of trees, those with condensed growth allowing a full maturity at less than normal size are ordinarily more in scale with most home properties. How often we see a really fine tree planted in an area totally unsuited to its ultimate size. The only thing to be done when it has outgrown the allotted space is to remove it entirely. So-called dwarf forms of our best trees should continually be watched for. The same is true of shrubby subjects. In both trees and shrubs the nursery trade offers considerable numbers of these "minor" or dwarf cultivars.

Other characteristics to seek include superior leaves or variant leaves, leaves that offer special interest in shape or in color, either through the year or in their autumnal decline.

In the case of plants grown for flowers, those of better size or lasting qualities, those which may extend the season of enjoyment by an earlier, a later or an everblooming habit, and those of clearer or novel coloring such as albinos are all to be valued.

There is in addition a tremendous untapped wealth of species not generally known nor usually available from any commercial source. Whereas only a few short years ago our native salal, evergreen huckleberry, kinnikinnick and vine maple were not to be found commercially in the Northwest, recent demand has resulted in a supply in nurseries. This is only a beginning; there are many other species which should find the same use, demand and ultimately the supply. By requesting native plant materials from our

*Mr. Davidson is among the most knowledgeable lay botanists in the Seattle area and a leading member of the American Rock Garden Society.

nurseries we can create a demand through interest which in time will be met by propagators, growers, wholesalers and retailers. Some few small specialist nurseries act in all these capacities to pioneer the novelties, and those who would plant them should first inquire from these possible sources.

Although the nursery industry, the system of arboreta and individual gardeners all have contributed to the stock of materials now available, the curious and the thoughtful collector may be convinced that there are still better things to be discovered in nature. The devoted nurseryman must constantly seek new items to lure customers. Arboreta are equally involved in observing and testing the novelties.

Both often rely on the observations and selection by the naturalist or the experienced layman who is constantly on the alert for anything that by its unusual qualities might prove to be of genuine worth, an improvement on the usual. Sometimes a sixth sense seems to guide him, but it is actually through the trials of the past that he has developed a special discernment, an ability to spot qualities easily overlooked. After selection, there follow the frustrating years of watching over small rooted pieces or grafts, and possibly the development of a small stock that can be shared so as to be judged by others under a diversity of growing conditions.

Some of the best places to look for new plants are those close to home. If one is tempted by the attractions of a quite foreign place, these exotic imports are often likely to prove difficult subjects when taken home, or they will require special conditions, which may mean laborious and often expensive alterations to create the necessary microclimate. To many innovators this is the very essence of their search. But not everyone is quite that keen. Most of us want an interesting, individual, but still easily maintained garden.

Keeping oneself informed of projected changes in land use, of any and all sorts of alterations from ditch maintenance along roadways to highway construction, from land clearing nearby to the sale of vast timber tracts — any of these might lead to legitimate collecting, which some believe to be conservation in its greatest meaning. (This should not apply, however, to those plants on the Endangered and Threatened Species List or those having a very restricted habitat; ideally they will have been set aside as "safe" in preserves of their own.)

The scope of organizations devoted to conservation might well include education in proper methods of collecting material under such conditions, doomed otherwise to destruction. We may learn to utilize many good plants now shamelessly wasted.

Occasionally someone, usually a botanist, discovers an entirely new plant, new alike to gardens and to science. It is a challenge to go foraging with the hope of finding at least one such in a lifetime. Most of us who have had an interest in nature and all its wonderful diversity will happily settle for far less than a new species among our finds. Just being able to enjoy and study the endless small variations of our everyday rambles is quite enough. Who is to say that the finding of some minor variant is not in the long run the greater gain?

Examples of collectables might include:

A stemless Douglas fir. This form of *Pseudotsuga menziesii* — when it is found — should be one of the most invaluable creeping and mounding conifers.[1] Only by crawling around on the ground could anyone expect to determine if a low-growing individual might be the one that had been created without the inherent ability to stand tall, or if it is only another deformed Douglas fir.

Cutleaf forms of maples. These are well-beloved among Japanese species. One cutleaf vine maple *(Acer circinatum)* has been propagated.[2] We might speculate on the numbers of others that have been overlooked or destroyed by logging or other man-made disturbances. Tripartite forms of mountain maple *(A. glabrum)* are not uncommonly found, yet to date none seem to have been propagated. Both these and normal *A. grandidentatum* would certainly make excellent small garden trees of special interest. In addition the dwarf vine maples being experimentally grown from witches' brooms might rival the slower growing Japanese maples in the nursery trade.

Non-flop ocean spray. With our *Holodiscus discolor,* in any but the driest situation, one must contend with an extraordinary degree of legginess and a lot of sprawl in order to enjoy the

[1]Such a one is under observation in the Wenatchee Ridge at present.

[2]The cultivar 'Monroe' which should soon become available.

incomparable lace of its flowering. *H. boursieri* was brought back from the Sierras many years ago where it had matured at under two feet, covering itself with flowers each year. The cultivar, named *H.* 'Tenaya'[3] goes to three feet or a little more in cultivation and has the same good habits as in the wild. Although the individual panicles are only half the size of those of our own *H. discolor,* there are many more of them.

A denser Oregon grape. Without doubt the mahonias (sometimes placed in the genus *Berberis*) are among our finest native evergreen shrubs, and some selected forms have met with success in the nursery trade. Most of the individuals of the species are relatively open. One exceptionally handsome cultivar with broad overlapping leaflets makes a densely foliated screening plant. The original[4] was collected by a cutting taken 25 years ago in Seattle from a plant growing amidst a general lot of skimpy, unimpressive seedling forms.

[3]Locally available and under test at Denver Botanic Garden (by some this is made a variety of *H. microphyllus).*

[4]This is tentatively called 'Madison Park.'

Selecting for tolerance to adversities is another consideration. In the Lochsa River drainage of Idaho is a disjunct colony of Pacific dogwood *(Cornus nuttallii)*[5] which ought to provide seedling strains more resistant to winter cold than the coastal plants. At the time the Arboretum was refurbishing with superior forms of this most beautiful of our native trees, one with bracts measuring eight inches was found in Siskiyou country. Seventeen out of twenty-five cuttings were struck from greenwood cuttings one summer, but they were misplaced during the ensuing growing-on season; the original tree has been destroyed by fire-road construction.

The Southwest and Great Basin are rich in good species that have come to little attention as garden material anywhere. Not many of these drought-resistant subjects will likely prove of exceptional use in the wet, humid Northwest, but the real plant adventurer will try them anyway — what's to be lost? A lot of speculative pleasure, at least, is to be gained.

[5]This strain is now in propagation at the Arboretum and elsewhere.

*A Selection of Nurseries Offering Native Plants**

WASHINGTON

Alpines West, Gardens and Nursery (Formerly Thurman's Nursery). Rt. 2, Box 259, Spokane, WA 99207. Phone 509-926-2108. Conifers, ferns and alpines. Propagated and collected material. Catalogue 50¢.

Forest Garden Nursery. Rt. 1, Box 148B, Granite Falls, WA 98252. Phone 206-691-6830. Trees and shrubs. Collected material.

MsK Rare Plant Nursery. 20066 15th Ave. N.W., Seattle, WA 98177. Phone 206-546-1281. Ferns and alpines. Propagated material. By appointment.

The Plant Farm. 11811 N.E. 73rd, Kirkland, WA 98033. Phone 206-822-1124. Alpines. Propagated material. List available on request. By appointment.

The Wild Garden. Box 487, Bothell, WA 98011. Ferns and alpines. Propagated material. Catalogue $1.00. Mail order only.

OREGON

Kline, Edgar L. 17495 S.W. Bryant Road, Lake Grove, OR 97034. Phone 503-636-3923. Bulbs. Catalogue on request.

Oregon Natives. Rt. 1, Box 7, Woodburn, OR 97071. Phone 503-981-1249. Trees and shrubs. Primarily propagated. Mainly wholesale, but enquiries welcome.

Siskiyou Rare Plant Nursery. 522 Franquette Street, Medford, OR 97501. Phone 503-772-6050 or 503-773-3707. Ferns and alpines. Catalogue 50¢. Mail order or by appointment.

Woodsman Native Nursery. Rt. 1, Box 280, Florence, OR 97439. Phone 503-997-2252. Collected material. Wholesale and retail.

*For those who wish to obtain native plants from nurseries, the above list offers a few suggested sources.

Photo: Brian O. Mulligan

Salix arctica **in fruit**

A Seed Collector's Journey

BRIAN O. MULLIGAN

For many years the late Carl S. English, Jr. of Seattle, accompanied by his equally knowledgeable botanist wife Edith, annually collected seeds of native plants, especially of trees and shrubs, in the western and southwestern United States. These he offered in exchange to many arboreta and botanical gardens throughout the world with which he corresponded. Such exchanges continually enriched the extensive collections of the gardens at the H.M. Chittenden Locks in Seattle over which he presided from 1940 to 1974.

Spurred by their accomplishments and also knowing the value of fresh, wild collected seeds to such institutions in our country and abroad as well as to members of the American Rock Garden Society and the British Alpine Garden Society (to both of which groups my wife and I have belonged for many years), we started some years ago to make smaller-scaled collecting expeditions. In September each year we travel principally to Idaho, western Montana and northern and western Wyoming, where the native flora is often quite different from that of Washington and where, since it usually grows at higher altitudes, it is likely to produce hardier plants for colder climates.

Collected seeds of woody plants have been turned over to the University of Washington Arboretum for inclusion in its annual exchange list with some 185 other institutions or correspondents. These plants include such genera as *Acer, Amelanchier, Betula, Cornus, Crataegus, Juniperus, Rosa, Sambucus* and *Sorbus*. To the two societies we send herbaceous plants and those suitable for rock gardens including *Aster, Aquilegia, Douglasia, Eriogonum, Fritillaria, Penstemon, Phlox, Petrophytum* and *Polemonium* species.

Early September is the period when the majority of seeds, especially of woody plants, are either ripe or approaching maturity. However, some herbaceous genera such as *Arenaria, Draba, Douglasia, Phlox* and *Polemonium* may mature in August except at the higher elevations;

consequently few seeds can be found in mid-September. It would be better to collect them in late August and leave the woody plants until three or four weeks later.

One of the more interesting and profitable areas which we have covered during the last five years has been western Montana, as far east as the Little Belt Mountains east of Helena, between Monarch and White Sulphur Springs. Outcroppings of calcareous rock create a suitable habitat for such rare plants as *Aquilegia jonesii, Eritrichium nanum, Clematis tenuiloba,* and the more common *Geum triflorum, Juniperus communis* var. *depressa, Potentilla fruticosa* and *Sedum stenopetalum*. The trees include *Abies lasiocarpa, Picea engelmannii, Pinus contorta* and the limber pine, *P. flexilis.*

East of White Sulphur Springs, on the road leading into the Castle Mountains, three species of junipers grow on the same hillside — the prostrate *Juniperus horizontalis, J. communis* var. *depressa,* about three feet tall, and finally *J. scopulorum*, the Rocky Mountain juniper which eventually forms a small tree. All three species were bearing fruits this year and the collected seeds are likely to give rise to some interesting hybrids.

From there one can go south through Livingston to Gardiner, Montana making a side trip southeast to McLeod and the Boulder River valley, if time permits, into the Absaroka range. The route continues across the north portion of Yellowstone National Park to Silver Gate, Cooke City and up to Beartooth Pass (almost 11,000 ft.). This region produces another typical limestone flora but should be seen at flowering time in late July to appreciate the wealth and variety of this high alpine garden. It contains the *Eritrichium, Lloydia serotina,* a diminutive bulbous plant found also in the Olympic and Cascade mountains of Washington, the creeping *Salix arctica,* and the charming little golden-flowered *Saxifraga chrysantha,* no more than two inches tall.

Along Highway 212 above Cooke City we have gathered seeds from species of *Aconitum, Artemisia, Geranium, Penstemon, Potentilla* and *Solidago*; in fact, the roadside flora of all these western states is a productive and valuable source of seeds, especially of herbaceous plants, but one must keep a sharp eye and drive slowly. Identification, of course, is easier if a few flowers remain but even without them most

Photo: Brian O. Mulligan

***Primula parryi* in fruit beneath a limestone ledge on Hunt Mountain in Wyoming (9,800 feet).**

plants can be identified by a competent botanist if an entire plant is collected and its source recorded at the same time. For this reason we carry a plant press to collect doubtful specimens. We have been particularly indebted to Dr. C. Leo Hitchcock of the University of Washington's Botany Department for his encyclopedic knowledge as well as his patience in identifying them.

Descending from Beartooth Pass to Red Lodge, Montana, one can gather seeds of *Phlox, Polemonuim* (two species) and the small, highly fragrant *Artemisia trifurcata* in a rocky site beside the highway. Continuing eastward to the Big Horn range in northern Wyoming, the limestone Medicine Mountain (almost 10,000 ft.) is a mecca for lovers of alpine plants. Neighboring Hunt Mountain, a few miles farther east, harbors a colony of the handsome *Primula parryi* in a damp site beneath a cliff.

At that point one has a choice of two return routes, the shorter via Shell Canyon to Greybull, Cody and Yellowstone National Park. We explored the longer one in 1972 through Worland to Riverton and northwest up the Wind River Canyon with its spectacular mountain scenery to Grand Teton National Park. The section from Buffalo to Worland deserves more time than we were able to allow it, since it crosses Powder River Pass (9,666 ft.) over the Big Horn range and the limestone cliffs of Tensleep Canyon below. The dwarf, deep blue-flowered *Lupinus lepidus* var. *utahensis* grows at and around the pass, while clumps of *Petrophytum caespitosum* can be seen on the canyon walls. *Juniperus scopulorum* is plentiful between Thermopolis and Riverton.

If one takes the Cody route, Dead Indian Hill

(about 8,000 ft.) and 22 miles to the northwest makes an interesting side trip. This offers a superb view over Sunlight Basin towards the Beartooth highway and mountains beyond. On the way down the silky-leaved *Phacelia sericea* grows along the gravel roadside; on the opposite bank is a colony of the rich blue-flowered *Penstemon cyaneus*, almost impossible to grow in the Seattle climate.

From Grand Teton National Park we usually return over Teton Pass (8,400 ft.) west of Jackson, Wyoming to collect the mountain maple, *Acer glabrum*, the shrubby *Sorbus scopulina* conspicuous with its scarlet fruits and the less obvious but strongly mint-scented *Agastache urticifolia*. At the top of the pass we ascend the hill on the south side to seek the yellow *Aquilegia flavescens*, tufted *Viola nuttallii*, the small almost prostrate *Aster alpigenus* var. *haydenii* and a variety of other subalpine denizens of this mountainside.

And so we continue down the hill and into Idaho. From its northern tip at Priest Lake to its southeastern corner adjoining Utah near Bear Lake, this state contains many areas of great interest to seed and plant collectors, but it is much too extensive to cover in the same trip. Such tours give excellent opportunities for slides or photographs of native plants *in situ* and for the collection of cuttings or seedlings of those likely to be worthwhile additions to Puget Sound gardens. ▲

Juniperus horizontalis **on Dead Indian Hill near Cody, Wyoming (6,900 feet);** ***Pinus flexilis*** **in background.**

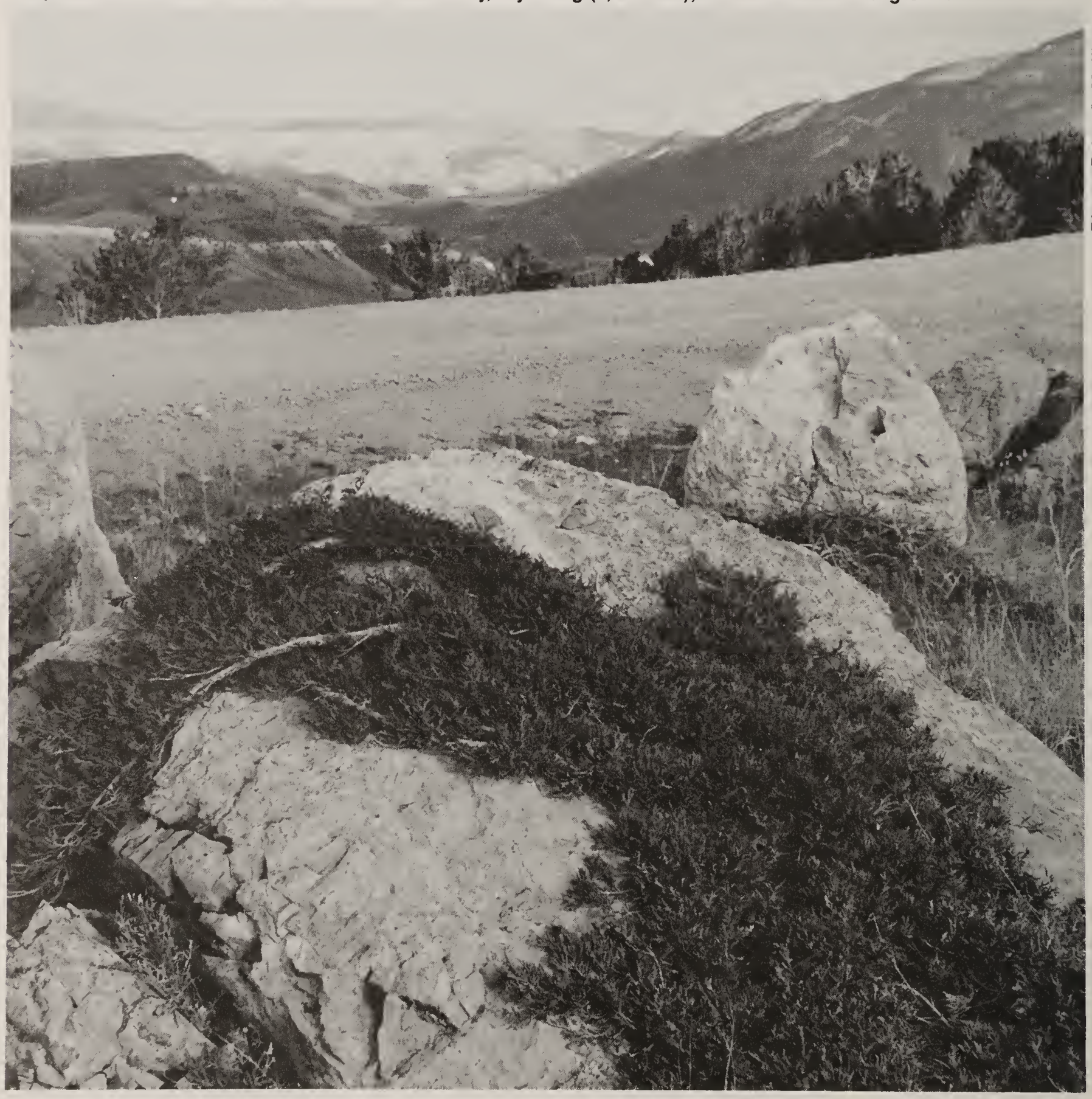


Photo: Brian O. Mulligan

A Rare Plant Nursery: How it Evolved

Photo: Jean Henderson

Mrs. Kruckeberg potting a fern in the work area.

*MAREEN S. KRUCKEBERG**

Having a botanist for a husband is not always the ideal situation that one might expect. Two plant people can find as much to argue about as the garden-happy wife and an obliging husband. We do have many advantages, however, and the most unique of these is the availability of unusual and interesting seed sources. This one factor transforms an ordinary backyard nursery into the rare plant nursery that has evolved from our garden.

Eighteen years ago I went house-hunting. Since my husband was away on a summer field trip, I had lots of time to browse. I soon found something far better than I had hoped for: an acre of slightly sloping terrain with a house and behind it a 20-foot drop to a three-acre meadow. Most of the large trees were Douglas firs *(Pseudotsuga menziesii),* but the one that clinched the sale was a white fir *(Abies concolor)*. It was and is a beautiful tree. Since I had made up my mind and I knew Art would agree, I told the owner we would take it. She looked at me for a second and then asked, "Wouldn't you like to see the house?"

A year later my father joined forces with us. Grandpa, as he was known to our family and friends, proved to be invaluable as the years went by. One Christmas my neighbor told me, "I don't want a mink coat or jewels under the tree; I just want a Grandpa."

And so we began the garden. We removed nearly everything except the mature trees, landscaping with more unusual and interesting plant material. The vegetable garden became Grandpa's domain, while Art claimed for a rock garden the area 30 by 60 feet which borders the driveway. The design was enhanced by some large irregular stones set in place by Henry Yorozu, the artist who selected the material for the Arboretum's Japanese Tea Garden. Art uses this semi-arid, sunny slope for many of the alpine and desert specimens he collects.

Slowly the garden began to assume a distinctive look. Periodically a little more lawn was removed to enlarge existing beds. The new plant-

---

* The garden of Dr. and Mrs. Arthur Kruckeberg is a mecca for plant lovers, and the nursery has become a welcome source of hard-to-find plant material.

Close-up of *Hebe pinguifolia* var. 'Pagei'
Photo: Jean Henderson

ing sites provided a challenge but they filled up much too fast. Fortunately there are still a few unplanted areas. Even though it is tempting, I will never remove all the grass. Lawn has a unifying effect and imparts a serenity that too many busy plants might destroy.

When the need for a potting bench and holding beds became evident, Grandpa built a work area that I immediately put to use. I started propagating plants mainly from cuttings, but growing from seed became an even more useful method. Seed can be obtained from all over the world; cuttings must usually be acquired locally.

Our rare plants have come from many sources. Visitors occasionally offer to send seed of plants available in their area but not grown here. We order from seed lists of plant societies and arboreta all over the world. The Arboretum plant sales often have interesting material. And, of course, our garden has become a valuable depository of seeds, seedlings and cuttings upon which I can draw every year.

Although I make an effort to take cuttings from the garden in the morning when they are physiologically in the best condition for rooting, I have had success with some received through the mail and even from overseas. As Margaret Mulligan told me years ago, "The best time to take a cutting is when it is offered."

Potting up seedling volunteers of a rare plant in the garden is a special thrill. A gardener feels more at one with nature in being able to provide an exotic plant with a situation where it can be happy enough to reproduce as it would in its native habitat.

As the garden matured, we began to have requests for tours. Visitors would see the work area filled with new seedlings and cuttings and would want to buy from the excess of potted plants that had accumulated. When I became aware that I couldn't legally sell without a license, the idea of starting a nursery was the next logical step. In 1971, a year after Jack Williams installed our greenhouse, I opened the MsK Rare Plant Nursery.

Some of the unusual areas I have specialized in are exotics from countries such as New Zea-

A corner of Dr. Kruckeberg's rock garden; in the foreground: *Hebe pinguifolia* var. 'Pagei' (right) and Anthemis species (left).

Photo: Jean Henderson

land, rare natives of the Pacific Northwest, ferns and container gardens.

New Zealand plants were an oddity in our garden a few years ago. However our interest in acquiring and experimenting with them has resulted in a delightful contribution to our landscape. This spring we were amazed at the number of times a visitor from New Zealand exclaimed, "Ah now, that is one of our plants!"

I feel sure that many more plants from mountainous regions of countries warmer than ours would flourish in northwest gardens. To obtain them for testing, however, would require more seed exchanges and seed collecting expeditions. Those that proved to be hardy could be added to the list of exotic plants we are now able to grow and enjoy in our area.

Native plants are often desirable horticultural subjects. My love for them grew, as did my knowledge, through the teaching and field trips of Dr. C. Leo Hitchcock (always known as Hitchy).** Many people are unfamiliar with the natives, however, and they are seldom available in nurseries. A notable exception is the Piggy-back plant, or Youth on Age *(Tolmiea menziesii)*, which must rate second only to Boston fern as a popular house plant. Very few realize that it is native to our Western Washington forests.

Unavailability of natives from nurseries is only

Corner of a recently installed solarium showing ferns growing among tufa rocks. Photo: Jean Henderson

one aspect of the neglect of this valuable resource. In the process of clearing land for building, it is common practice for developers to bulldoze out all of the salal, low Oregon grape, wild currant, native dogwood, twinflower and red huckleberry.

These same plants are highly prized among the English, who are far more sophisticated and knowledgeable horticulturists than we are. They consider our native dogwood *(Cornus nuttallii)* a very choice tree. The introduction of our wild currant *(Ribes sanguineum)* by David Douglas in

** Dr. Hitchcock is Professor Emeritus, Botany, University of Washington.

A group of miniature gardens in the display area.

Photo: Jean Henderson

1826 paid for his three-year expedition from England to the Pacific Northwest. Learning the value of our own natives will be a sign of maturity in our horticultural endeavors.

At the same time that gardeners should be educated to recognize the ornamental potential of native plants, they should also be discouraged from outright collecting except perhaps in front of the bulldozer. Natives usually can be established more successfully from seeds and cuttings than by collecting whole plants.

The quiet beauty of ferns, which I have long admired, has become more fascinating for me in recent years since I have been able to grow them from spore. To accentuate their diversity, we have built beds of limestone and tufa.

I never cease to enjoy the creation of container gardens. As well as being easy to care for, they are also a visual delight. These miniatures are for me the highlight of the garden and the vacation work of the nursery.

When visitors ask, "How do you do it?" my answer is that you must love plants, know them and enjoy working with them. A nursery, added to commitments to children, home, garden and my botanical drawing, are more than most people are willing to cope with. But I am grateful to my nursery, for it has given me some of the happiest moments of my life. ♦

Notes and Comments

The catalogue of woody plants in the Arboretum compiled by Brian O. Mulligan, Director Emeritus of the Arboretum, will be published in January in both hardcover and paperback editions. The price has not yet been determined, but inquiries may be directed to the Arboretum office, 543-8800.

We have received the good news that Lewis Clark's excellent book on wildflowers of British Columbia is being republished in an edition enlarged to cover the Pacific Northwest. You may order it at a 10 percent discount by calling Mrs. Harry S. Slater, 232-0456, or the Foundation office, 325-4510.

Hortus Third, a dictionary of plants cultivated in North America, has recently been published in a single volume containing 1344 pages and nearly 24,000 entries. Macmillan Publishing Co., New York. Price $99.50

In the preceding issue the names of the authors Ehrlich and Ehrlich in the references were misspelled (P. 23). In the interest of accuracy, the *Bulletin* will publish errata as they come to our attention either in this column or in a place of their own if they become too numerous.

Announcements from the Unit Council

"Use It, Use It Up" is the provocative title of the 16 mm color film to be shown at the March 17th Unit Council meeting at St. Stephen's Episcopal Church, Laurelhurst. Produced by the University of California Extension Media, it is concerned with the problem of the use and disposal of solid waste.

At the Council meeting on September 16th, Dr. Jack Raskin, Head of Clinical Services in the Department of Behavioral Sciences at the Children's Orthopedic Hospital, spoke on "Gardening Hobbies as Therapy for Children," and on November 18th Dr. Janet Hohn's topic was "Kitchen Botany." The final meeting of the year on May 19th will be devoted to annual reports.

District meetings are being planned to augment Unit Council meetings and offer an opportunity for members of different units in each district to become better acquainted with each other and with Unit Council activities.

— All Kitsap-Bainbridge Island Units will meet on January 7th to see slides of the proposed Union Bay Arboretum site.

— Ed Hume, Garden Editor of the *Seattle Times*, will be the featured speaker as members of units of the East Side District get together at 8 p.m. on January 20th at the Puget Sound Power and Light Auditorium in Bellevue.

— On Thursday, February 10th at 10 a.m. at the United Church of Christ members of Mercer Island units will gather to hear House Plant Unit 84 present a program "What You've Always Wanted to Know About House Plants." There will be house plants for sale and coffee will be served.

— A tour and wine tasting party at Ste. Michelle Winery in Woodinville is scheduled for members of North Shore units on April 25th at 6:30 p.m. The winery is well known to many as the former home of Mr. and Mrs. Phillip Macbride who were active supporters of the Arboretum for many years. The lovely gardens remain largely intact and contain much choice plant material.

An enthusiastic group of future guides toured the Arboretum with Joe Witt in October in three different sessions visiting little known areas and becoming familiar with all parts of the Arboretum. This group will be the nucleus of a guide program that will lead tours through the Arboretum. Other sessions are planned for the spring during the blooming season. Those taking part in these training sessions are asked to lead at least two tours the following year.

The Native Walk Guides have had several interesting training sessions. In early November Annette Wendel (Mrs. Reed), who served for two years as a naturalist at Olympic National Park, led the guides along the waterfront trail looking for migrating birds. Recently Sheila Taft (Mrs. David), Assistant Chairman, led the guides over the trail showing them things of particular interest to young children. In early winter a visit to the Northwest Indian collection at the Burke Museum is planned. There are 29 active Native Walk Guides who lead an average of four to five tours a year. If you want to become a guide or know of a group that would like to be shown along the Native Walk call Elizabeth Moses (Mrs. Allen) at 822-9346. There are also 12 trained guides ready to take you on tours of the Japanese Garden which is particularly beautiful in the spring. Call Rip or Ray Collins (Colonel LeRoy) at 232-5258 if you are interested.

A continuation of Dr. Janet Hohn's course in botany will be offered during Winter Quarter if there is sufficient interest. Call Sally Sue Coleman, 822-3300, or the Foundation office, 325-4510.

A cabinet to house the hundreds of herbarium specimens mounted by the Herbarium Committee has been ordered for the Foundation office and will be a welcome addition. The first Friday of every month finds this busy committee collecting specimens in the Arboretum, putting them in presses, or mounting and labelling. Call Bettina Bailey (Mrs. Gayton) at 522-0158 if you'd like to help. The goal is to have at least one herbarium sheet for each plant species in the Arboretum.

Dates which should be on every unit member's calendar are April 14th, Work and Fun Day, and May 4th and 5th, Plant Sale.

Elizabeth Moses (Mrs. Allen) visited recently with a group of volunteers which has formed to support the University of British Columbia Botanical Garden in Vancouver, B.C. and shared information with them about our Unit Council activities. She reports that the new alpine garden and the British Columbia native garden, with the adjacent Museum of Anthropology, are well worth a visitor's time. The gardens are open daily; the museum which contains an extensive collection of Northwest Indian art is open on Tuesdays from noon to 9 p.m. and Wednesday through Saturday from noon to 5 p.m. Anyone interested in arranging a tour should call the Friends of the Garden at 604-228-3928 or write to 6501 N.W. Marine Drive, Vancouver, B.C. V6T-1W5. Elizabeth was particularly impressed with the spacious offices at the Office and Education Center housed in the former home of the University President.

From the proceeds of the spring Plant Sale, $16,000 was turned over to Joe Witt to be used at his discretion in the Arboretum.

Another successful fall Bulb Sale under the enthusiastic guidance of Jeanne Gardiner (Mrs. Arthur) resulted not only in a profit of $4,000 to $5,000 for the Arboretum but the addition of thousands of beautiful flowering bulbs to the gardens of the area. In addition, at least 50 new members accepted the invitation to join the Arboretum Foundation which was included in the bulb list this year in a paragraph which pointed out some of the advantages of membership. Jeanne wished particularly to thank the approximately 30 persons who helped in the tremendous job of sorting and packaging the 50,000 bulbs, half of which had to be potted upon arrival. Over 600 customers bought bulbs which had come from Oregon, California, Tennessee, North Carolina, Holland and England.

Hundreds of varieties of bulbs may be seen blooming in a display garden behind the Arboretum office. New species are being added every year with an attempt made to prolong the season by adding more summer and fall blooming varieties. The best bloom is in late April and May. Visit the garden and decide which kinds of bulbs you want to order next year.

RUTH MARY CLOSE

REMEMBER

The Arboretum Foundation Plant Sale

Wednesday, May 4th, from 4-8
Thursday, May 5th, from 10-4

To offer donations call
Mr. and Mrs. Victor Sivertz (Chloe)
522-7252.

For that special plant
pre-order from
Barbara Andersen (Mrs. James)
232-0752.

If you would like to work on
the Sale, give your name to
Margaret Parsons (Mrs. Buckey)
454-5897.

Photo: Jean Henderson

Mr. and Mrs. Pablo Abellera with some of the dahlias he offers each year at the Plant Sale. She is wearing a dress made from the many ribbons Pablo has won at dahlia exhibitions.

University of Washington Classes

Since once again the *Bulletin* is not likely to arrive before registration time, we emphasize that those who are interested in adult education classes of any kind should have their names placed on the free mailing list for *Spectrum*, the quarterly journal of Continuing Education. For further information call 543-2590.

Arboretum Courses

CULTIVATED CONIFERS. Mr. Joseph Witt, plant curator, will discuss the great wealth of coniferous trees and shrubs that can be grown in western Washington gardens. Emphasis will be on identification and culture. Class will meet in 107 Winkenwerder on UW campus; limited to 25. Wednesdays, Jan. 19, 26, Feb. 2, 16, 23; March 2, 9, 16; 7-9 p.m. 8 sessions, $15.

BIRD IDENTIFICATION FOR BEGINNERS. Merilyn Hatheway, experienced birder, will conduct a field class on land birds commonly found in the Arboretum and waterfowl on Lake Washington. Binoculars required; appropriate clothing and boots recommended. Class limited to 15; meet at Arboretum office. Saturdays, Jan. 22, 29, Feb. 5, 12, 19, 25; 9-11 a.m. 6 sessions, $15.

WINTER PROPAGATION. Mr. Richard van Klaveren, Arboretum propagator, will teach techniques for propagating woody plants, including cutting and seeding. Materials and plants furnished. Arboretum greenhouse; class limited to 15. Saturdays, Jan. 15, 29; 9:30-12:00 noon. 2 sessions, $12.

GRAFTING ORNAMENTALS. Mr. van Klaveren will instruct in techniques for grafting woody plants. Materials and plants furnished. Arboretum greenhouse; class limited to 15. Saturdays, Feb. 5, 19; 9:30-12:00 noon. 2 sessions, $12.

HOUSE PLANTS. Mr. van Klaveren will discuss indoor plants. Topics covered include identification, techniques of propagation, and care. Materials and plants furnished. Arboretum greenhouse; class limited to 15. Saturdays, March 5, 12, 26; 9:30-12:00 noon. 3 sessions, $15.

BASIC GARDEN MAINTENANCE. Mr. Chico Narro, expert nurseryman, will teach a class on basic gardening techniques. Included are soil preparation, planting, fertilizing, mulching, pruning, and seasonal care of plants. Class limited to 15; Arboretum greenhouse. Saturdays, Feb. 12, 19, 26, March 5, 12, 19; 1:30-3:30 p.m. 6 sessions, $15.

PRUNING ORNAMENTALS. Mr. Narro will demonstrate techniques of pruning trees and shrubs. This is an outdoor demonstration class; appropriate clothing and waterproof footwear are recommended. Class limited to 30; meet at Arboretum greenhouse. Saturdays, March 19 (10-12 noon), March 26 (1:30-3:30 p.m.). 2 sessions, $5.

For further information, call 543-2730. To register, send a check, made payable to the University of Washington, to: Arboretum Courses, Anderson Hall (AR-10), University of Washington, Seattle, WA 98195.

Continuing Education

The University's Continuing Education courses for Winter Quarter, 1977 will include an interesting selection of (mostly) evening courses. Besides offerings in color, and black and white photography, there will be a nine-session course in plant propagation and a science class for third and fourth graders which will meet for 10 sessions on Saturday mornings.

Of particular interest to native plant enthusiasts is "Alpine Plant Life" to be taught by Ola Edwards, who has done special research in this field.

Community Colleges

Until such time as the *Bulletin's* publication dates coordinate better with registration times for the community colleges, it seems to be an exercise in futility to publish their schedules. Instead we would remind you that several of these institutions are offering excellent courses for credit as well as adult education classes.

For example, the Edmonds Community College will have a three-credit course on Native Plant Materials in the Landscape on Saturday mornings, and the Bellevue Community College will offer a night course in Landscape Design.

Readers who wish to be informed of such offerings would be well-advised to have their names placed on the mailing lists of the appropriate institutions.

New Members of the Arboretum Foundation

We are pleased to welcome the following new members (July 17, 1976 through October 15, 1976):
Sponsor — Mrs. Heather Arnatt. *Contributing* — Mrs. James S. Lucas, Mr. and Mrs. George W. Molly. *Sustaining* — Mrs. Arthur S. Biddle, B.A. Hamilton, M.D., Mr. and Mrs. Frank Herbert, Mrs. Margaret K. Steele, Emil Ziner, Uplake Garden Club. *Annual* — Mrs. Marcia J. Arnold, Ms. Jani Asplund, Mrs. C.W. Atran, Mrs. A.C.U. Berry, Jr., Mrs. Dennis Berry, George L. Boggess, Mrs. Conor Boyd, Miss Susan Byrd, Yvonne Conner, Doris E. Cornell, the Rev. and Mrs. J. Finley Cooper, Mrs. Thomas W. Dahlgren, Lawrence de Fato, Mr. and Mrs. Jan H. de Groot, Priscilla Dickert, Mr. James Docter, Miss Marion Docter, Mrs. George W. Dusek, Mrs. Edward Ellenbogen, Jane Emerson, Bernadette Epstein, Mrs. Joe T. Favra, Mrs. C.P. Finch, Wendy Fremmerlid, Mrs. Gordon Forbes, Marlene Frey, Mrs. Lorin W. Fyall, Mrs. Van Gerlach, Mrs. Bruce Gillespie, Mrs. Maida Gillette, Bob Goehring, Mrs. George A. Graham, Mrs. R.T. Greene, Mrs. Richard Grocock, Miss Kara Dawn L. Gross, Mary Gruenwald, Mrs. Adele L. Hagan, Mrs. Robert M. Hall, Mrs. Frank Hanawalt, Al Hicks, Mrs. Mary Hineline, Mrs. Joan H. Hoeft, Raymond L. Jacques, Kenneth N. Janeck, Lorraine Kimmel, Mrs. Dale Klein, Earl D. Knowles, Mrs. La Salette Lewis, Linda Lindquist, Julia Magnusson, Mrs. Stanley Markytan, Marjorie Martin, Mrs. Florence B. Maxwell, Mrs. Sheila A. Metcalf, Alice Meyer, Mrs. Lee C. Michaud, Mrs. Kathryn Miller, Mrs. R.A. Moen, Mrs. Susan G. Moss, Mrs. Anne W. Napier, Mrs. Anita Nelson, Oscar A. Nelson, Mrs. John M. Nordstrom, Geraldine H. Norwood, Mrs. Elva Jo Paget, Mrs. Darlene Pate, Mrs. Connie G. Pious, Mrs. L.A. Powell, Jr., Mrs. David Princehouse, Catherine Rao, Mrs. R.V. Rethke, Stebbins C. Rohrback, Betsy Rosen, Mrs. Rose P. Rosing, Ruth Rowlands, Mrs. Charles Roy, Patricia J. Russell, Mrs. Eino J. Salo, Marjorie Sandusky, Mrs. R.D. Saunders, Mrs. Zelda M. Scheyer, Mr. and Mrs. David Schneebeck, Mr. and Mrs. Edmund C. Schorr, Mrs. Fritz Schreder, Mrs. Lois Seilheimer, Mrs. Luana Sever, Mrs. Steven Shaiman, Mrs. Ken Shannon, Jim Smith, Dr. and Mrs. Meredith Smith, Roger D. Smythe, Mrs. Daniel Solaro, Jr., Mrs. Gordon L. Swartzman, Mrs. William E. Talbott, Mrs. Elsie Thomason, Mrs. R.P. Thomason, Mrs. Stephen Urner, Mrs. K.J. Usack, Sandra Weiss, Mrs. Dina Wells, Mrs. William W. Wessinger, Jane C. Williams, Mrs. Darlene M. Wing, Irene Zommers.

Of these 112 new members, 40 have joined as a direct result of participation in this fall's Bulb Sale.

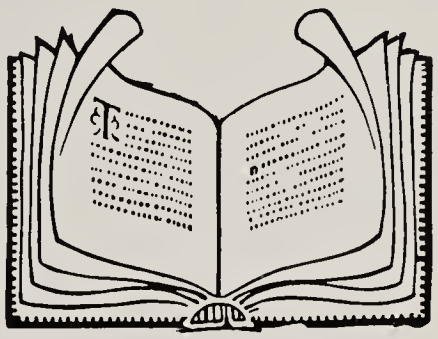
We are also grateful to the following who have increased their dues to: *Life* — Mr. and Mrs. John W. Anderson. *Supporting* — Mrs. T.A. Wilson. *Contributing* — Mrs. Kenneth R. Boyle, Mr. and Mrs. James C. Coons, Mr. and Mrs. James Fukuda, Mrs. H.E. McCray. *Sustaining* — Mr. Reilly Atkinson, Jr., Mrs. Ronald Barentsen, Dave Brastow, Mr. and Mrs. Leigh Freeze, Kelly Dodson, Mrs. Gordon Logan.

CHOICE and UNUSUAL
Trees — Shrubs — Vines
Garden Accessories
TROPICAL INDOOR PLANTS
Largest & Finest Selection
In the Entire Northwest

Cut Flowers
Potted Plants and Gifts
COMPLETE FLORAL SERVICE

Swanson's
LAND OF FLOWERS
9701 - 15th N.W. — Phone SU 2-2544
Producers of Fine Plants Since 1888

The BOOK COMMITTEE
of
The Arboretum Foundation
sells books to members
at a 10% discount



To order, call:
Mrs. Harry S. Slater 232-0456
The Foundation Office 325-4510

Compliments of
FRAYN
PRINTING COMPANY
LETTERPRESS • LITHOGRAPHY • STEEL DIE ENGRAVING
2518 WESTERN AVENUE • SEATTLE, WASHINGTON 98121/(206) 623-4221

For GIFTS and FLOWERS
of Unmistakable Distinction
Crissey
FLOWERS • GIFTS
622-1100
1335 Fourth Avenue — Washington Building
2100 Fifth Avenue at Lenora

THE ARBORETUM BULLETIN

Published by the
Arboretum Foundation
University of Washington Arboretum
Seattle, Washington 98195

MRS. H. P. CLAUSING
13002 N.E. 3RD
BELLEVUE, WA 98005

NON-PROFIT ORG.
U. S. POSTAGE PAID
SEATTLE, WASHINGTON
Permit No. 126

ADDRESS CORRECTION REQUESTED

CALENDAR OF EVENTS

DATE	EVENT
January	
6	Unit Council Governing Board
13	Foundation Executive Committee
February	
3	Unit Council Governing Board
10	Foundation Executive Committee
March	
3	Unit Council Governing Board
10	Foundation Board of Directors
17	Unit Council Meeting
April	
7	Unit Council Governing Board
14	Foundation Executive Committee
14	Work and Fun Day
May	
4&5	Plant Sale

REGULARLY SCHEDULED:

Every Tuesday	Greenhouse Day
1st Monday	The Mae Granston Rhododendron Study Group
1st Friday	Herbarium Committee
3rd Monday	The May Guy Northwest Natives Study Group
3rd Wednesday	Rock Garden Study Group
4th Monday	Special Study Group
4th Wednesday	Arboretum Explorers

FOR INFORMATION, CALL 325-4510